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The Crisis Below: An Investigation of the Reliability and Transparency of the MTA's Subway Performance Reporting

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Executive Summary

As is well known to every commuter, New York City subway service, including particularly on-time performance, has been steadily declining for years. Delays[1] reported by the Metropolitan Transportation Authority ("MTA") more than tripled between 2012 and 2017,[2] the average speed of trains reportedly fell to 1950's levels,[3] and a lower percentage of trains arrive on time than in any other major subway system.[4] The subways' decline has inflicted substantial costs on the City and on New Yorkers personally, wasting an estimated $389 million per year in lost economic activity and wages for workers[5] and subjecting thousands of riders to untold delays getting where they need to go.

This investigation by New York City Comptroller Scott M. Stringer chronicles something less well-known: for years, the MTA knowingly misled the riding public by reporting information it knew to be inaccurate, thereby obscuring the subways' decline, misrepresenting the causes of delays, and masking significant operational problems. Relying on internal MTA analyses never before made public, as well as interviews with key MTA officials, this report makes clear that agency executives continually obscured inconvenient facts and thereby cast the agency in a more positive light. The net effect of this culture of obfuscation was to hide the truth behind the system's deterioration, even as MTA executives were repeatedly informed by agency personnel tasked with analyzing

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[1] Under MTA Operational Directive 1.303 (issued October 1, 2014), section 4.2, the MTA deems a "Delay" to have occurred when a scheduled train: (1) reaches its final destination more than five minutes behind schedule; (2) fails to make any scheduled stops (an "Enroute Abandonment" or "EABD"); or (3) fails to depart from its originating terminal within certain time limits (a "Terminal Abandonment" or "TABD"). For purposes of official delay reporting, unscheduled trains cannot be "delayed."

[2] Monthly delays totaled 27,682 in January 2012 and 83,167 in December 2017, a 200.4 percent increase. *See* New York City Transit ("NYCT") Committee Monthly Operations Reports for meetings respectively held March 26, 2012, and February 20, 2018. Monthly Operations Reports are provided to the Board and Board Committees and posted on the MTA's website in advance of the monthly meetings. *See* http://web.mta.info/mta/news/books/.

[3] Mahler, Jonathan, "The Case for the Subway," The New York Times, January 3, 2018. https://www.nytimes.com/2018/01/03/magazine/subway-new-york-city-public-transportation-wealth-inequality.html (last visited February 6, 2019).

[4] Santora, Marc, "Failing Subway Threatens New York's Financial Future, M.T.A. Chief Says," The New York Times, November 20, 2017. https://www.nytimes.com/2017/11/20/nyregion/subways-new-york-lhota-mta.html (last visited February 6, 2019).

[5] Office of New York City Comptroller Scott M. Stringer, "The Economic Cost of Subway Delays," October 1, 2017, at p. 2-3.

system performance that its public disclosures were inaccurate and, in some cases, meaningless.

In brief, the Comptroller's Office found:

- From mid-2015 forward, numerous internal MTA analyses concluded that the MTA's databases and delay tracking protocols were routinely unable to accurately identify the causes of delays and, in particular, chronically misattributed delays to "Overcrowding." A July 2015 internal MTA analysis described methodological breakdowns in stark terms, stating "[n]o policy or guidance exists on how dispatchers should properly identify the cause of a particular delay or on how delays should be assigned to incidents,"[6] while a January 2016 internal MTA analysis noted that "much of the delay data is incomplete or unreliable, particularly the classification/categorization of delays and the assignment of delays to particular incidents."[7] Despite being informed of these deficiencies, MTA officials continued for years to publicly promote inaccurate information and misrepresent what the MTA knew about the causes of delays, casting the agency in a more positive light and shielding it from accountability.
- Throughout 2016, MTA officials repeatedly asserted that subway service was improving based on reported increases in Wait Assessment scores, a metric intended to approximate the amount of time passengers must wait on platforms and long-touted by the MTA as its most important indicator of subway service. But there again, internal analyses obtained by the Comptroller's Office show that MTA executives were cautioned that changes in Wait Assessment scores subsequently highlighted to MTA Board members were meaningless and likely the result of sample error. When technological advancements in data collection finally made clear that Wait Assessment scores had actually gotten worse, not better as the MTA had previously reported, the MTA quietly restated its previous inaccurate Wait Assessment results without disclosing that its earlier declarations of progress had been wrong. Five months later, the agency began to emphasize new metrics for reporting subway performance.
- The MTA distorted its publicly reported statistics on delays by effectively hiding certain delays it internally attributed to "Unknown" causes. Instead of clearly alerting the public that the causes of these delays were unknown, for nearly a decade MTA officials simply apportioned them among the MTA's fifteen publicly reported

[6] MTA Performance Analysis Unit ("PAU") internal "Project Note" analysis, "Delays – Attributing Incidents and Causes," July 2, 2015, at p. 1. The MTA created PAU in late 2013 because it could not explain the causes of rising system-wide delays. Among other things, MTA executives relied on analyses composed by PAU when preparing for monthly meetings of the MTA Board's Transit and Bus Committee ("Transit Committee"). Based on the MTA's responses to the Comptroller's information requests, from at least June 2017 forward, PAU authored virtually all of MTA analyses of the causes of improvement or worsening subway service.

[7] PAU internal "Project Note" analysis, "Delay Study Project Notes," January 13, 2016, at p. 1.

categories of delays[8] – obscuring their existence without any public explanation. In this way, in Monthly Operations Reports provided to the public and the MTA Board from 2013 through mid-2018,[9] the MTA hid the truth about 525,710 delays internally grouped as "Unknown" in what was until recently the database MTA used to report delays. This apportionment concealed the fact that the MTA's delay tracking protocols were unable to identify the causes of a significant number of the delays occurring in the system.

- Similar to the MTA's misrepresentative reporting of these "Unknown" delays, the MTA's recently featured reporting of "Major Incidents" obscures critical information and is also based on unreliable data. Publicly defined by the MTA as any incident that delays 50 or more trains, Major Incident reporting is based on MTA tracking protocols that routinely misidentify the number of delays caused by an incident, such that the MTA cannot reliably determine the number of incidents that cause 50 or more delays. Moreover, the MTA's Major Incidents reporting methodology excludes significant numbers of Major Incidents the MTA has historically tracked internally – including all incidents charged to "Planned Work," a large category that regularly bogs down whole subway lines. This exclusion and the MTA's methodology for identifying Major Incidents has never been clearly explained to the public.

The MTA has, in fact, acknowledged some of these issues and instituted changes throughout last year. Among other things, New York City Transit ("NYCT") President Andy Byford has emphasized the need to identify the "root causes" of delays. In recognition of the fact that overcrowding is not the root cause, the MTA removed its "Overcrowding" delay designation from Monthly Operations Reports and re-categorized it as "Operating Environment." This rebranding, however, has done little to address the underlying inaccuracy of the MTA's delay data. Rather, as reflected in this report, systemic deficiencies remain embedded in the MTA's performance reporting and continue to obscure the true causes of delays. We encourage the MTA to consider the information in this report and use it to improve the MTA's transparency, accountability, and, ultimately, the overall functioning of the New York City subway system.

[8] The number of delay categories in MTA's Monthly Operations Reports has varied slightly over time, such that the MTA has not reported precisely fifteen different delay categories over the entirety of the time that MTA apportioned TDD "Unknown" cause delays.

[9] Monthly Operations Reports are provided to the Board and Board Committees and posted on the MTA's website in advance of the monthly meetings. *See* http://web.mta.info/mta/news/books/.

Specifically, we recommend that the MTA:

1. Structure public reporting of performance information to maximize transparency, reliability, and accountability and, as part of this effort, report all delays on its subway performance Dashboard.
2. Publish detailed definitions of all delay categories, specifically indicating what each one includes and, as necessary, omits.
3. Ensure that all procedures relevant to performance reporting are formally codified in official policies and procedures, including establishing written definitions and instructions for all key terms, data categories, and work protocols.
4. Train all relevant personnel on procedures relevant to performance reporting.
5. In the context of public reports of Major Incidents, provide the public with information about all categories of service disruptions that cause 50 or more delays tracked as incidents within Subway Incident Reporting System, including specifically Planned Work.
6. Transparently disclose in each Monthly Operations Report and on the MTA's subway performance Dashboard the methodologies used to calculate performance metrics, including all exceptions and revisions to those methodologies and methodological weaknesses.
7. Make available monthly on the MTA's website or through an Open Data portal all data in the SIRS database and any other databases relied on for public reporting.

Introduction

The importance of accurate data cannot be overstated: it is a critical tool for evaluating and managing any organization, especially one as large and complex as the MTA. An organization that does not establish clear performance metrics to track its goals, ensure that data is collected properly and transparently, and make adjustments based on feedback sets itself up for failure.

As this report makes clear, time and again the MTA has failed to adopt necessary controls to ensure the reliability and integrity of its public disclosures and misrepresented subway performance information in ways that cast its operations in a more favorable light than was reflected in the information it had internally. Worse, even after MTA staff repeatedly flagged weaknesses in data reliability, top agency officials continued to communicate information to the public that they knew misrepresented internal data and failed to take sufficient action to remedy the true causes of declining service.

Internal records show that, as far back as 2015, analysts in the Department of Subways' PAU, the unit specifically tasked with briefing agency executives on subway performance information, deemed both of the MTA's delay tracking databases – the Terminal Delay Database ("TDD") and the Subway Incident Reporting System ("SIRS") – to be fundamentally unreliable. A July 2015 analysis described the MTA's databases as being critically undermined by control weaknesses and said that employees blamed door holding (one of several circumstances the MTA publicly reported under the category "Overcrowding") for delays so excessively that the resulting data was nearly useless. According to that analysis:

> No policy or guidance exists on how dispatchers should properly identify the cause of a particular delay or on how delays should be assigned to incidents. . . . Dispatchers rely on train crews to report the cause of delays, and these explanations are suspect. The root cause of a delay often may not be apparent to a train crew. In addition, a train might be delayed by more than one cause or incident. 'Door holding' is the most frequently used incident code (over 20% of all incidents), but it is used both inconsistently and incorrectly. Therefore it provides almost no useful information.[10]

[10] PAU internal "Project Note" analysis, "Delays – Attributing Incidents and Causes," July 2, 2015, at p. 1.

To his credit, NYCT President Andy Byford has driven a reappraisal of the MTA's subway performance data, heeded analysts' findings, and begun remedying substantial operational deficiencies that previous administrations did not sufficiently disclose or address. Early in his tenure, President Byford acknowledged that the MTA's previous "Overcrowding" reporting category was "not particularly meaningful"[11] and "a misrepresentation" because it did not communicate the "underlying root cause" of delays.[12] While these acknowledgements and the changes he has implemented are laudable, it nonetheless remains important to understand the MTA's chronic failures to ensure the accuracy and transparency of its data reporting going forward. Such an understanding is critical to improve current practices and prevent a culture of obfuscation from again undermining the integrity of the MTA's performance disclosures and misleading the public about the true causes of problems and the path to fix them.

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[11] Nir, Sarah M., and Rosentha, Brian M., "'Overcrowding' Is Not at the Root of Delays, Subway Chief Says," The New York Times, February 20, 2018. https://www.nytimes.com/2018/02/20/nyregion/subway-delays-overcrowding.html (last visited February 6, 2019).

[12] Rivoli, Dan, "NYC Transit will stop blaming train delays on 'overcrowding,'" New York Daily News, June 17, 2018. https://www.nydailynews.com/new-york/ny-metro-mta-subway-delays-andy-byford-20180616-story.html (last visited February 6, 2019).

I. Investigative Findings

A. The MTA Blamed Overcrowding as the Cause of Delays Where Its Own Records Did Not Support That Conclusion

Until recently, the MTA employed two systems to record delays, the TDD, used to publicly report the causes of delays until July 2018, and SIRS, used for internal tracking and analysis of the causes of delays. In July 2018 SIRS replaced the TDD as the database used for public delay reporting.[13] As far back as 2015, MTA analysts determined that the TDD and SIRS were both generally unreliable and that the MTA's official protocols could not accurately identify the causes of delays it publicly attributed to "Overcrowding." Accordingly, for years, while the MTA continued to blame crowding for the system's woes, top agency officials received monthly performance briefings showing that the MTA's delay data was unreliable and that its public delay reporting misrepresented the causes of delays attributed to "Overcrowding."

Understanding the depths of the disconnect between the MTA's public delay reporting and the internal information provided to senior officials requires some knowledge of how TDD and SIRS operate.

- In the TDD, dispatchers wrote brief remarks summarizing the cause of delays based on oral explanations provided by the crews of delayed trains after they reached their final destinations. Other MTA employees then individually reviewed the remarks and, based on their reviews, tagged each delay with one of ninety-nine possible TDD "Reason Codes" that the reviewers determined most closely reflected the cause of each delay. Every month until July 2018, when the MTA began using SIRS to report delays, these TDD Reason Codes were mapped to the fifteen delay categories previously listed in Monthly Operations Reports, such as "Track Gangs," "Car Equipment," and "Overcrowding," the last of which consisted mostly of delays tagged with Reason Codes respectively titled "Customer Holding Doors" and "Insufficient Capacity."
- In SIRS, which predated the TDD and was used for internal delay analysis before also becoming the database used for public delay reporting in July 2018, dispatchers stationed in the MTA's Rail Control Center record the causes of delays in "Incident Letters" based on calls to the center from train crews as they encounter "incidents." The MTA has no official definition of what an "incident" is, but agency officials

[13] The MTA first used SIRS for public performance reporting in October 2017, when it began reporting Major Incidents.

> have publicly described an "incident" to mean any interruption of service.[14] Following the creation of the Incident Letters, RCC personnel compare the time and location of incidents with logs of delayed trains' travel history. If a delay appears to have clearly resulted from an incident, the delay is tagged with the Trouble Code previously applied to that incident. Where delays are not clearly attributable to previously identified incidents, RCC employees create new incidents in SIRS to account for the delays, tagging those incidents and delays with Trouble Codes corresponding to a category inaccurately titled "crowding" within SIRS. These delays are reported in MTA Monthly Operations Reports under a category titled "Operating Environment," one of several revised delay categories the MTA adopted in July 2018 when it began using SIRS to report delays.

Internal MTA records show that, by mid-2015, MTA analysts had determined that delay cause attributions in the TDD and SIRS were generally unreliable and that, in particular, the protocols for creating this data were unable to correctly identify the causes of delays publicly attributed to "Overcrowding." An analysis drafted July 2015 described these databases as being critically undermined by control weaknesses and said that employees blamed door holding for delays so excessively that the resulting data was nearly useless.[15] According to that analysis:

> No policy or guidance exists on how dispatchers should properly identify the cause of a particular delay or on how delays should be assigned to incidents. . . . Dispatchers rely on train crews to report the cause of delays, and these explanations are suspect. The root cause of a delay often may not be apparent to a train crew. In addition, a train might be delayed by more than one cause or incident. 'Door holding' is the most frequently used

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[14] *See* description of "incidents" articulated to MTA Transit Committee by former Vice President of Subways during the Transit Committee's May 2015 monthly meeting, held May 18, 2015, at minute 1:02:15-30 of meeting video, available at https://www.youtube.com/watch?v=gHYk0qUnmqI&feature=youtu.be&t=3735. The MTA posts videos of all Board committee meetings on its official Youtube.com channel, available at https://www.youtube.com/user/mtainfo.

[15] The July 2015 internal analysis relied on above was labeled a "draft" when provided to the Comptroller's Office, as were most of the PAU analysis relied on and quoted in this report. Except as relates to the creation of SIRS Incident Letters, the MTA does not have any policies or procedures requiring that subway performance analyses be officially finalized or approved. As a result, almost all of the analyses composed by PAU were perpetually labeled as drafts. In addition, some contain minimally conflicting date information, and none were formally certified as representing the official opinion of the MTA. However, as noted, PAU was created for the purpose of performing these analyses and the PAU findings that are relied on and quoted in this report are consistent with multiple years of briefing materials provided monthly to MTA executives, with public comments by MTA officials about historic deficiencies in the MTA's performance reporting, and with recent MTA disclosures concerning how the MTA succeeded in reducing delays in late 2018.

> incident code (over 20% of all incidents), but it is used both inconsistently and incorrectly. Therefore it provides almost no useful information.[16]

Analyses prepared soon thereafter again questioned the reliability of crowding attributions in the MTA's databases, noting that the growth in the number of delays attributed to "Overcrowding" had dramatically outpaced contemporaneous ridership increases. One such report dated as drafted in January 2016 stated, "Much of the delay data is incomplete or unreliable, particularly the classification/categorization of delays and the assignment of delays to particular incidents."[17] The report further remarked on inconsistencies inherent in the data:

> From 2003 to 2013, weekday ridership increased 21% but total weekday delays increased nearly 400% ... Yet delays fell from 1994 to 2003, simultaneously with a large increase in ridership, so ridership is clearly not the only cause… Indeed the share of delays in the morning peak has declined, despite being the time of day with the heaviest ridership and worst crowding.[18]

Similarly, an analysis dated as drafted in February 2016 stated that:

> Although ridership has grown, and some relationship has been established between ridership and delays, the increase in delays attributed to crowding have significantly outpaced the increase in ridership. While most of the crowding delays occur during the peak periods, which see the highest concentration of ridership, again, there doesn't seem to be a proportional

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[16] PAU internal "Project Note" analysis, "Delays – Attributing Incidents and Causes," July 2, 2015, at p. 1. The Comptroller's Office first requested that MTA provide all policies, procedures, or guidance relevant to MTA's reporting of Delays and Major Incidents in January 2018. Thereafter, consistent with the comments reflected in MTA's internal analyses, long-tenured employees of the respective work units responsible for recording the causes of delays in the TDD and SIRS interviewed by the Comptroller's Office said that they could not recall any policies, procedures, guidance, or other documents providing instruction on how employees should determine the root causes of delays. However, at the close of this investigation, MTA provided the Comptroller's Office with several documents which contained partial instructions related to identifying the causes of delays, including two draft Microsoft PowerPoint presentations and an untitled, undated, one-page document concerning the differing ways that certain SIRS Incident codes should be used. None of the employees interviewed recalled any such documents and we did not identify any references to these documents in the MTA's numerous internal analyses concerning the identification of causes of delays. The documents themselves were not captioned as policies, procedures, or otherwise as controlling documents governing MTA employees, and were not provided to our Office until almost a year after they were first requested.

[17] PAU internal "Project Note" analysis, "Delay Study Project Notes," January 13, 2016, at p. 1.

[18] PAU internal "Project Note" analysis, "Delay Study Project Notes," January 13, 2016, at p. 1.

> relationship between the increase in delays and ridership. . . As such, Crowding is now the single largest category of delays . . . and yet there is no clear explanation of what is happening, nor is it clear how accurate the attribution of delays to Crowding is. In order to help address the underlying issues, it must first be understood what is happening.[19]

Consistent with the concerns expressed above, by February 2016, analyses provided to senior MTA officials in advance of monthly meetings of the MTA Board's Transit Committee indicated that the MTA's official delay tracking protocols could not identify the causes of a significant portion of all delays, and particularly of those delays which the MTA publicly attributed to "Overcrowding."[20] For analytical purposes, these analyses[21] described the growing category of delays aggregated under "Overcrowding" with various terms including "Unknown/Other,"[22] "No Capacity, Crowding, Excess Dwell, Unknown,"[23] and "Insufficient Capacity/Excess Dwell/Unknown."[24]

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[19] PAU internal "Project Note" analysis, "Effects of Crowding on Service," February 29, 2016, at p. 1.

[20] "TAC Prep" analysis, "Performance Variance Explanations – Estimated Quantification of Causes of Change in Performance – December 2015," February 5, 2016 (estimating that "Other/Unknown" factors accounted for 29 percent of the increase in delays as tracked in the TDD and 30 percent of the increase in Delays as tracked in SIRS from January through December 2015, and further that "JZ Line Unknown Issues (mostly in crowding and planned ROW work categories)" accounted for 14 percent of the increase in TDD-tracked delays and 13 percent of the increase in SIRS-tracked delays during that time.). With NYCT's Department of Subways, the term "TAC Prep" was used to refer to meetings and briefing materials related to preparing MTA executives for meetings of the Transit Committee. Based on interviews and documents obtained from MTA, in some instances "TAC Prep" materials were distributed to meeting attendees electronically and in other cases hardcopy "TAC Prep" materials were brought to these meetings.

[21] *See* Appendix I for an example of a "Heat Maps," a type of document regularly included in "TAC Prep" materials prepared for MTA executives in advance of the Transit Committee's monthly meetings.

[22] "TAC Prep" analysis, "Estimated Quantification of Causes of Change in Performance – February 2017," April 21, 2017 (with regards to delays tracked in the TDD, estimating that, from March 2016 through February 2017, declining ridership prevented 30 delays per weekday; "TABD-induced crowding" accounted for an increase of 35 delays per weekday (and stating "Increase in delays charged to dwell/capacity correlated with TABDs, which are increasing"); and that "Unknown/Other" factors accounted for an increase of 162 delays per weekday (and stating "Temporary Disruption/Incident delays are relatively easy to explain via SIRS data, but delays due to changes in the operating environment are not. "Crowding" delays behave consistent with changes in operating environment (signal modifications, flagging rules/practices, more cautious train operation, etc.)."). *See* Appendix II for this variance analysis, a type of document regularly included in "TAC Prep" materials prepared for MTA executives in advance of the Transit Committee's monthly meetings.

[23] "TAC Prep" analysis, "SIRS Heat Map: Delays Per Weekday, System," April 11, 2017, at p. 5 of April 12, 2017, "TAC Prep" packet prepared in advance of the Transit Committee's April 2017 meeting.

[24] "TAC Prep" analysis, "SIRS Heat Map: Delays per Weekday, System, Peak & Off-Peak," September 7, 2017, at p. 74 of September 2017 "TAC Prep" packet prepared in advance of the Transit Committee's

At the core of the MTA's misattribution of the causes of delays was its decision to group delays tagged with the TDD Reason Codes "Insufficient Capacity"[25] and "Customer Holding Doors"[26] under the umbrella of "Overcrowding."[27] The Comptroller's Office's review of TDD records confirmed that neither of these two Reason Codes reliably indicated that crowding had caused the delays to which either was applied.

The MTA has never formally defined the meaning of "Insufficient Capacity" and could not provide any official policy or procedure governing the circumstances under which the term should be used describe the causes of delays. In interviews with the Comptroller's Office, MTA employees with responsibility for generating TDD data were unable to concretely define "Insufficient Capacity" and said it applied to *any circumstance* where trains are delayed and the train's crew cannot point to a specific incident or circumstance that caused the delay.[28]

Similarly, "Customer Holding Doors" also proved to be an unreliable indicator of crowding. As recited in the July 2015 analysis mentioned above, MTA employees blamed door holding so "inconsistently and incorrectly" that the explanation was characterized by MTA analysts as providing "almost no useful information."[29]

To gain a more complete picture of the how the MTA misrepresented crowding as the greatest cause of delays, the Comptroller's Office reviewed TDD records for delays that the MTA publicly attributed to "Overcrowding" from 2016 through 2017, during which "Insufficient Capacity" and "Customer Holding Doors" delays accounted for 87 percent

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September 2017 meeting (listing the "Insufficient Capacity/Excess Dwell/Unknown" delay category as accounting for 39 percent of the overall growth in average weekday delays tracked in SIRS from August 2015 through August 2017).

[25] From 2013 through April 2018, the TDD Reason Code "Insufficient Capacity" was applied to 346,102 delays tracked in the TDD.

[26] From 2013 through April 2018, the TDD Reason Code "Customer Holding Doors" was applied to 733,173 delays tracked in the TDD.

[27] In materials prepared in response to Comptroller information requests, the MTA stated that it was unable to identify the individuals responsible for this decision or when the decision was made. Accordingly, the MTA is unable to identify how long it practiced the misrepresentative TDD delay reporting practices detailed in this report.

[28] This description is consistent with a 2016 training presentation obtained from the MTA which said that Insufficient Capacity referred to circumstances where a train becomes delayed gradually along its route rather than at any one particular location. *See* "Stringlines Training – Identifying Incidents and Service Management Actions," drafted April 2016, and revised August 2016, at p. 25.

[29] PAU internal "Project Note" analysis, "Delays – Attributing Incidents and Causes," July 2, 2015, at p. 1.

(570,093) of reported "Overcrowding" delays.[30] Our review found that the relevant TDD data did not provide detailed, reliable information about the causes of those delays sufficient to support their attribution to "Overcrowding,"[31] and in thousands of cases, explicitly pointed to other causes. For more than 140,000 delays associated with these two Reason Codes, the spaces intended for explanatory remarks were left entirely blank, merely referred to the fact that the train was late without indicating why, or only referred to unspecified system congestion.[32] For example, for thousands of remarks, the only description of the cause of delay was the phrase "Excess Dwell," sometimes with the name of a particular subway station. According to documents provided by the MTA, "Excess Dwell" refers to any circumstance where a delayed train spent a greater than usual time at a station without a clear cause for why it did so.[33] Thousands of other remarks simply read "late arrival,"[34] "late arr,"[35] or other descriptions that similarly indicate that a train was late but do not indicate the cause.

Moreover, our sample of such delays identified hundreds of instances where TDD remarks explicitly indicated that delays resulted from operational failures rather than from crowding. For example, in over 450 instances, remarks indicated that delays primarily resulted from track or train inspections, with remarks reading "Inspection," "MONDAY INSPECTION," "!!FRI INSP!!," or other similar phrases.

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[30] The remaining 13 percent were tracked in the TDD as "Unknown" cause delays that were apportioned into the MTA's reported "Overcrowding" delay category, as discussed in Section I(C) below.

[31] *See* Appendix III for selected illustrative TDD "remarks" included in the sample of reported "Overcrowding" delays from 2016-2017.

[32] For example, 2016-2017 TDD Delay data included at least 387 delays reported as "Overcrowding" for which the associated TDD remarks read "Plugged by Leader" (251 coded as "Insufficient Capacity" and 136 coded as "Customer Holding Doors"). The almost identical remark "plug by leader" appeared at least 173 times (114 delays coded as "Insufficient Capacity" and 59 coded as "Customer Holding Doors").

[33] *See* "Stringlines Training – Identifying Incidents and Service Management Actions," drafted April 2016, and revised August 2016, at p. 25 (stating that "Excess Dwell" should be used to describe the cause of a delay where a "Train experiences above normal (atypical) dwell times" and there are "No other contributing causes." While there was no separate TDD Reason Code titled "Excess Dwell," this phrase appeared in thousands of TDD Delay remarks coded "Customer Holding Doors" and "Insufficient Capacity." In SIRS, the MTA has a Trouble Code titled "Excess Dwell Time."

[34] The Comptroller's review of a sample of TDD Delays reported under "Overcrowding" from 2016-2017 identified 863 delays for which remarks read only "late arrival."

[35] The Comptroller's review of a sample of TDD Delays reported under "Overcrowding" from 2016-2017 identified 438 delays for which remarks read only "late arr."

When the MTA developed revised delay categories in July 2018, it adopted the term "Operating Environment" in place of its historic "Overcrowding" category.[36] In documents prepared in response to the Comptroller's information requests, the MTA explained that the term "Operating Environment" reflects its view that the delays in this category "are due to the operating environment rather than specific events that create delays."[37] The MTA's public Monthly Operations Reports do not list any subcategories under this heading or otherwise disclose a fuller explanation of the causes of the delays identified as caused by "Operating Environment." As discussed below in Section II, though the MTA's official delay tracking protocols are unable to formally identify their causes, analyses provided to MTA executives in 2017 concluded that "most 'crowding' delay charges . . . are largely the result of operating environment issues *other than ridership/crowding.*" (Emphasis in original.)[38]

B. Wait Assessment: MTA Executives Repeatedly Claimed That Service Had Improved Based on Information Known to Be Meaningless

For years, the MTA designated Wait Assessment[39] as the agency's most important metric for gauging the quality of subway service. It accounted for 60 percent – more than all other metrics combined – of the subway "Service Key Performance Indicator" the MTA published in its Monthly Operations Reports. It listed Wait Assessment statistics first in

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[36] From October 2017 to the MTA's July 2017 transition to using SIRS to publicly report delays, MTA Monthly Operations Reports used the term "Overcrowding/Insufficient Capacity/Other" in place of the former "Overcrowding." Though MTA officials had repeatedly declared crowding to be the greatest cause of delays throughout the preceding years, no mention of this terminology change was made in the Department of Subways' October 2017 monthly oral performance report to the Transit Committee.

[37] *See* Appendix IV, containing untitled, undated document prepared by MTA in response to the Comptroller's information requests, describing the categories of Delays reported and tracked internally by the MTA in connection with TDD delay reporting.

[38] October 10, 2017 Memoranda titled "Variance Analysis Supplementary Information," included in October 2017 "TAC Prep Packet." Consistent with this analysis, a document prepared by the MTA in response to the Comptroller's information requests stated that delays reported under the MTA's "Overcrowding" reporting category were "typically" related to factors other than crowding.

[39] Wait Assessment is a calculation intended to quantify the evenness of subway service by measuring the percentage of intervals –the time that passes between consecutive trains on the same line– that exceed the scheduled interval time. As explained in MTA Monthly Operations Reports, "Wait Assessment (WA), is measured as the percentage of intervals between trains that are no more than the scheduled interval plus 25%. Minor gaps are more than 25% to 50% over the scheduled headway, medium gaps are more than 50% to 100% over the scheduled headway, and major gaps are more than 100% over the scheduled headway, or missed intervals."

those reports, and almost always highlighted Wait Assessment trends at the beginning of the Department of Subways' monthly oral performance reports to the Transit Committee.[40]

Until April 2017, the MTA reported Wait Assessment statistics using a mixture of fully accurate, electronic data for A-Division subway lines (numbered lines) and manually-collected sample data for B-Division subway lines (lettered lines), which necessarily had a margin of error.

Records obtained during the investigation establish that during at least five different meetings of the Transit Committee in 2016 and 2017, MTA officials prominently highlighted what they cast as improved or unchanged Wait Assessment scores, purporting to show that subway service was getting better or remaining stable. In fact, internal pre-meeting analyses presented to these officials beforehand stated that the results the officials subsequently highlighted during Transit Committee Meetings were statistically insignificant. Specifically, these pre-meeting analyses stated that certain increases in by-month and by-year Wait Assessment scores did not evidence "real" service improvements because they fell within or did not exceed the margin of error inherent to their calculation.[41]

For instance, an internal analysis circulated to MTA executives before the Transit Committee's September 2016 meeting stated "Improvement in [12-month average Wait Assessment scores] is due to B-Division and not statistically significant." Nevertheless, in the Transit Committee's meeting that month, MTA's Acting-Vice President of Subways positively described the Authority's progress over the previous year as measured by Wait Assessment, beginning his remarks by stating "Good morning. The 12-month system-wide Wait Assessment ending in July was 78.5 percent, which is .4 percent higher than last year."[42]

Although the Comptroller's Office identified certain instances where disclosures concerning margins of error were included in pre-meeting draft scripts of MTA executives' comments,[43] none of these disclosures were recited in the relevant oral reports to the Transit

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[40] NYCT executives make oral presentations to the MTA Transit Committee during the Transit Committee's monthly meetings. The MTA has no rules or procedures regarding the content of these oral performance reports. In an interview, a former MTA Acting-Vice President of Subways said that the content of the oral reports the Acting-Vice President provided to the Transit Committee reflected his "final opinion on what [information was] important" to convey to the Transit Committee.

[41] *See* Appendix V for an example of a "One Pager," a type of analysis regularly included in "TAC Prep" materials.

[42] *See* video of the Transit Committee's September 2016 meeting, held September 26, 2016, at minute 11:23 (available at https://www.youtube.com/watch?v=ewjCWGbXGoQ&feature=youtu.be&t=683).

[43] *See* October 31, 2016, draft script for November 2016 Transit Committee meeting and December 2, 2016, draft script for December 2016 Transit Committee meeting, which included language reading "but

Committee; and MTA personnel interviewed in connection with this investigation could not identify any point where the MTA otherwise disclosed this information.

The illusion of improvement unraveled in early 2017 when the MTA completed a multi-year process to generate electronic train location information for lettered lines and thus no longer needed to rely on manually-collected sample data for the B-Division. This allowed the MTA for the first time to retroactively calculate Wait Assessments using a complete population of statistics with no margin of error. Once it did, however, it was confronted with an uncomfortable truth – the new, fully accurate figures showed that the Wait Assessment statistics previously highlighted as improved had actually *worsened* over the previous year.

Although this new, more accurate data became available in February 2017, MTA officials did not mention its availability during the Transit Committee's March 2017 meeting and did not report the new figures until the Committee's April 2017 meeting.[44] At that April 2017 meeting, the MTA quietly restated its previously-published 2016 Wait Assessment statistics without disclosing that the newly-available data contradicted the MTA's many prior declarations that subway service had improved.[45]

In September 2017, five months after the fully accurate statistics revealed a decline in performance rather than improvement, the MTA declared that it no longer considered Wait Assessment to be a relevant performance indicator and announced new performance metrics, particularly emphasizing Major Incidents.[46]

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statistically unchanged" after the scripted references to improved Wait Assessment scores. MTA records do not clearly establish if the draft scripts provided to the Comptroller's Office were the final versions used by Department of Subways' leadership. Accordingly, it is unclear if these disclaimers regarding margins of error were removed during the drafting process or were included but not read aloud to the Transit Committee.

[44] The version of the MTA's March 2017 Monthly Operations Report included in the MTA's "TAC Prep" materials (dated March 9, 2017) prepared in advance of the Transit Committee's March 2017 meeting included the accurate Wait Assessment data, but the final version provided to the public and the Transit Committee eleven days later did not. In response to Comptroller's Office inquiries, the MTA stated that it was unable to identify the officials responsible for this decision.

[45] The MTA's April 2017 Monthly Operations Report included a brief note stating that prior period Wait Assessment data had been restated. While the draft script included in "TAC Prep" materials prepared in advance of the Transit Committee's April 2017 meeting included the language "currently reported prior period Wait Assessment figures that were derived from sample data have been restated with fully electronic data," these comments were not included in the Department of Subways' April 2017 oral performance report to the Transit Committee.

[46] *See* September 27, 2017, MTA Press Release, "MTA Launches New Customer-Focused Subway Performance Dashboard Providing Metrics Surpassing Global Standards for Transit Systems," (stating that the MTA's "Legacy" performance metrics are "not considered relevant indicators of customer experience).

C. The MTA Buried Certain Delays Internally Recorded as Resulting from "Unknown" Factors by Apportioning Them to Other Reported Causes without Explanation

Another way the MTA misrepresented the causes of delays concerns its treatment of delays tagged with TDD Reason Codes titled "Illegible"[47] and "No Reason,"[48] both of which it rolled up into an undisclosed internal TDD delay tracking category titled "Unknown."[49] Specifically, from February 2009 through April 2018, pursuant to agency policy, MTA officials took all the "Unknown" cause delays and simply apportioned them across the MTA's fifteen publicly reported categories of delay causes.[50] So, if a specific cause accounted for 10 percent of all delays, then 10 percent of the "Unknown" delays were added to that cause's numbers. This apportionment had the effect of hiding the "Unknowns" from view and of concealing the fact that the MTA's delay reporting was substantially less precise than its published reports suggested.

Accordingly, in Monthly Operations Reports provided to the public and the MTA Board from 2013 through mid-2018, the MTA apportioned 525,710 delays internally grouped under this "Unknown" cause category (13.4 percent of all delays reported during that period) to the MTA's fifteen reported delay categories.

In addition to masking the fact that more than 10 percent of the causes of delays were categorized by the MTA as "Unknown," this apportionment most substantially increased the number of "Overcrowding" delays reported because that category already contained the largest number of delays. As such, from 2013 through mid-2018, the "Overcrowding" category in Monthly Operations Reports received 29.3 percent of all TDD "Unknown"

Available at http://www.mta.info/press-release/nyc-transit/mta-launches-new-customer-focused-subway-performance-dashboard-providing (last visited February 7, 2019).

[47] From 2013 through April 2018, the TDD Reason Code "Illegible" was applied to 126 Delays tracked in the TDD.

[48] From 2013 through April 2018, the TDD Reason Code "No Reason" was applied to 525,584 Delays tracked in the TDD.

[49] The "Insufficient Capacity" and "Customer Holding Doors" TDD delays discussed earlier were also grouped under a different internal tracking category titled, in part, "Unknown" ("Unknown/Insufficient Capacity/Crowding/Door Holding"). Though for sake of clarity this report discusses those delays separately from the "Unknown" cause delays discussed here, in substance, the MTA misrepresented the causes of all or almost all delays tagged as "Customer Holding Doors," "Insufficient Capacity," "No Reason," and "Illegible." At present, the MTA reports all delays tagged with SIRS Trouble Codes that are analogous to these TDD Reason Codes under the same category, "Operating Environment." For December 2018, the MTA's reporting of Delays based on SIRS data attributed 30.6 percent of delays to "Operating Environment."

[50] *See* Appendix VI, a February 20, 2009 email and attachment, the only document identified by the MTA as authorizing and providing instructions for the practice.

cause delays, inflating the total number of delays attributed to "Overcrowding" by 154,256. This percentage was even higher in 2016 and 2017, during which 36 percent of these internally tracked "Unknown" cause delays were publicly attributed to "Overcrowding" (82,868 additional delay attributions) and 64 percent were attributed to the other reported delay categories (collectively inflating these categories by 144,581 delays).

In interviews with the Comptroller's Office, MTA officials were unable to identify any instance where the practice of apportioning these "Unknown" cause delays to other categories was disclosed to the public or the MTA Board. However, shortly after the Comptroller's Office learned of this practice through an interview of an MTA employee, the MTA briefly reported these "Unknown" cause delays under a separate category titled "Unassigned." Making that change, the MTA's Monthly Operations Reports for April through June 2018 included a note stating that "[h]istorically, unassigned delays have been proportionately distributed across delay categories in Board reporting materials. This month they are shown separately as unassigned." From the first inclusion of the "Unassigned" delay category in Monthly Operations Reports in April 2018 through its last appearance in June of the same year, none of the Department of Subways' oral performance reports mentioned the MTA's former policy of apportioning those delays and the impact that policy had on the MTA's official delay statistics over the previous decade.

D. The MTA's New Public Reporting of "Major Incidents" Suffers from Flaws Similar to Those Found in Its Reporting of Delays

In recent months, the MTA has prominently positioned Major Incidents in communications with its Board and the broader public as the metric most indicative of the customer experience.[51] The agency publicly defines Major Incidents as incidents that delay 50 or

[51] Major Incidents were listed first in the MTA's September 2017 announcement of its New Metrics. *See* September 27, 2017, MTA Press Release, "MTA Launches New Customer-Focused Subway Performance Dashboard Providing Metrics Surpassing Global Standards for Transit Systems," available at http://www.mta.info/press-release/nyc-transit/mta-launches-new-customer-focused-subway-performance-dashboard-providing (last visited February 7, 2019). Major Incidents have since been consistently listed first in the MTA's Monthly Operations Reports. http://web.mta.info/mta/boardmaterials.html. Major Incidents are currently listed first on the MTA's Dashboard and automatically open upon arrival on the site, such that they serve as the Dashboard's homepage. *See* http://dashboard.mta.info/ (last visited February 7, 2019).

more trains. [52] According to the MTA Subway Performance Dashboard, "such events cause the *most* disruption to customers." (Emphasis added.)[53]

Despite the attention the MTA has given them, Major Incidents have not proven to be a transparent or reliable indicator of overall service quality[54] or of the MTA's success at reversing the subways' long-term decline. To begin with, the MTA cannot reliably calculate the number of Major Incidents that occur because it is unable to reliably determine the number of delays caused by each incident. As stated in an internal analysis from October 2017, existing protocols for identifying Major Incidents result in MTA employees "arbitrarily grouping delays into incident letters," and "most incidents are merely groups of delays."[55] Incident Letters obtained by the Comptroller's Office included numerous instances where hundreds of delays were attributed to incidents with "incident durations" (*i.e.*, initial train stoppage/blockage time) of only a few minutes, without detailed explanations of why the delays were attributed to the corresponding incidents or even specific identification of the trains deemed to have been delayed.

More importantly, our investigation found that the agency does not publicly report certain Major Incidents that it has historically tracked in briefings for agency executives. Specifically, the MTA excludes from its public reports all incidents attributed in SIRS to both "Planned Work" – such as incidents caused by track and signal work, both huge sources of disruption throughout the system – and "Other Operating Environment" causes. MTA officials explained these exclusions by asserting that "Planned Work" and "Other Operating Environment" are not true incidents but rather are conditions (*i.e.*, ever-present characteristics of the environment in which subways operate). However, the investigation found that internal MTA briefing materials for agency executives historically included both "incidents" and "Major Incidents" attributed to "Planned Work" and "Other Operating Environment" causes. MTA executives' briefing materials obtained by the Comptroller's Office show that this practice continued into 2018, though portions of these briefing documents sometimes described such service disruptions as "Other Significant Events" or

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[52] After initially introducing Major Incidents as "the number of incidents each month that delay 50 or more trains," the MTA now describes them as the number of "*unplanned* incidents that delay 50 or more trains" in the Monthly Operations Reports. (Emphasis added.) The Dashboard still omits the word "unplanned." *See* http://dashboard.mta.info/ (last visited February 7, 2019).

[53] http://dashboard.mta.info/ (last visited February 7, 2019).

[54] The MTA has historically attributed less than 16 percent of reported delays to Incidents tracked within SIRS as causing over 50 delays.

[55] PAU internal "Project Note" analysis, "Delay Data Improvement Project," October 30, 2017, at p. 1.

"50+ Train Delay Letters Not Reported As Major Incidents" when including them in conjunction with lists of reported Major Incidents.[56]

The omission of internally-tracked "Planned Work" Major Incidents from the MTA's published statistics significantly lowers the total number of publicly reported Major Incidents. "Planned Work" accounted for roughly 8 percent of internally-tracked Major Incidents prior to the implementation of the Subway Action Plan[57] but rose in frequency to as much as 28 percent after it was implemented.[58] Between October 2017 (the first month MTA began publishing Major Incidents statistics) to August 2018 (the latest month for which the Comptroller's Office obtained SIRS data), the MTA reported 860 Major Incidents but omitted 322 Major Incidents caused by Planned Work. By doing so, the MTA lowered the number of publicly reported Major Incidents by 37 percent.

The MTA's omission of Planned Work Major Incidents in its publicly reported Major Incidents statistics continues its practice of presenting performance data in ways that cast the subways in the best light without disclosing what its internal statistics truly reflect. Just as the MTA arbitrarily apportioned certain "Unknown" delays tracked in the TDD to "Overcrowding" and other categories without telling the public, it excludes "Planned Work" from its publicly reported Major Incidents statistics without clearly disclosing that it does so, thereby obscuring the total number of service disruptions experienced by the public that result in 50 or more delays.

[56] *See* Appendix VII for an example of a document illustrating such practice.

[57] In the six months before the Subway Action Plan was announced (January through June 2017), 552 incidents were recorded in SIRS as having caused 50 or more delays, of which 44 were attributed to Planned Work.

[58] In the six months after the Subway Action Plan was announced (August 2017 through January 2018), 593 incidents were recorded in SIRS as having caused 50 or more delays, of which 133 were attributed to Planned Work (22 percent). During the following six months (February 2018 through July 2018), 668 incidents were recorded in SIRS as having caused 50 or more delays, of which 189 were attributed to Planned Work (28 percent).

II. The Path Forward

As previously noted, New York City Transit President Andy Byford has driven a reappraisal of the MTA's protocols for tracking and reporting delay data. In early 2018, President Byford acknowledged that the MTA's "Overcrowding" delay classification was "not particularly meaningful" and stated that it reveals nothing about the "underlying root cause" of delays.[59] In June 2018, the MTA debuted revised reporting categories, and replaced the term "Overcrowding" with "Operating Environment."[60] In addition, over the last few months of 2018, the MTA achieved an 11 percent reduction in delays system-wide.[61] At the Transit Committee's December 2018 meeting, MTA executives credited this reduction in delays to having developed "a far greater understanding of root cause" during the previous year, which they said had allowed them to assign "meaningful programs and actions to address those root causes of delay."[62]

The reforms instituted in 2018 address some of the issues highlighted in this report and certain causes of the steady rise in delays. Although the MTA's removal of "Overcrowding" from its categories of delays is a long-overdue step towards transparency, to date, the MTA has yet to acknowledge that its prior use of "Overcrowding" was internally known for years to be a mischaracterization before it ceased publicly using that term.

"Operating Environment," the term adopted in its place, still perpetuates misleading aspects of the MTA's previous reporting by obscuring the MTA's full understanding of the causes behind such delays. Just as the MTA reported delays under "Overcrowding" in the TDD which it internally determined were not caused by crowding, now using SIRS, its use of the term "Operating Environment" obscures its determination that delays reported under that category are primarily the result of avoidable operational failures. For example, a "Preliminary Format" of the MTA's revised delay category descriptions provided in advance of the June 2018 Transit Committee meeting included a proposed category

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[59] Nir, Sarah Maslin and Brian M. Rosenthal. "'Overcrowding' Is Not at the Root of Delays, Subway Chief Says," New York Times, February 20, 2018.

[60] *See* Appendix VIII, containing the presentation on revised delay reporting categories presented at the Transit Committee's June 2018 meeting.

[61] The MTA reported 67,952 delays for December 2018, 9,045 fewer than the 76,997 delays the MTA reported for July 2018.

[62] *See* video of the Transit Committee's December 2018 meeting, at minutes 32:05-36:27.

described as "Operating Environment Non-Incidents (*e.g.*, schedule misalignment, insufficient capacity, operator variability)."[63]

Describing the root causes the MTA has now taken action on to achieve the recent reduction in delays, at the December 2018 meeting of the Transit Committee, MTA officials specifically singled out improperly calibrated track signals and unnecessarily slow speed limits as significant contributing factors to a widespread reduction in train speeds throughout the subway system.[64] However, they did not make clear when these problems first came to the MTA's attention, which our investigation found dated back to at least early 2017. A March 2017 presentation provided to MTA executives stated that signal modifications to reduce speed limits had resulted in "a reduction in throughput beyond any projected impact," and that, as a particular result of faulty signal modifications, train crews "tend to operate significantly below posted [speed limits], further reducing capacity and lengthening running times."[65] Echoing this analysis, briefing materials prepared for MTA executives the following month stated:

> Temporary Disruption/Incident delays are relatively easy to explain via SIRS data, but delays due to changes in the operating environment are not. "Crowding" delays behave consistent with changes in operation environment (signal modifications, flagging rules/practices, more cautious train operation, etc.).[66]

Another analysis for senior MTA officials in October 2017 stated that, while the MTA had not yet performed sufficient research to rule out all other causes, "The great majority of evidence to date points towards signal modifications and slower crews as the (proximate) cause of declining reliability" and the "primary culprit behind the [subways'] gradual, long term decline."[67] This analysis further stated that "most 'crowding' delay charges . . . are

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[63] *See* "PRELIMINARY FORMAT" revised delay reporting categories and associated descriptions, at p. 66 of June 2018 "TAC Prep" materials prepared in advance of the Transit Committee's June 2016 meeting, attached at Appendix IX. This additional detail was not included in the MTA's presentation of revised delay categories later that month, and since that time, the MTA's Monthly Operations Reports have not listed any subcategories explaining the causes of delays reported under "Operating Environment."

[64] *See* video of the Transit Committee's December 2018 meeting, at minutes 40:00-42:42.

[65] Email titled "RE: Questions for presentation," March 11, 2017, attaching presentation document with file name "Subway Performance Challenges for President 2017-02-13."

[66] "TAC Prep" analysis, "Performance Variance Analysis – Estimated Quantification of Causes of Change in Performance," April 11, 2017, included materials prepared in advance of the Transit Committee's April 2017 meeting.

[67] "TAC Prep" analysis, "Variance Analysis Supplementary Information," October 10, 2017, included in materials prepared in advance of the Transit Committee's October 2017 meeting.

largely the result of operating environment issues *other than ridership/crowding.*" (Emphasis in original.)[68]

At the December 2018 Transit Committee meeting, NYCT President Andy Byford conceded that the MTA's recent success reducing delays was the result of "things that could and should have probably been done a long time ago. No brainers. Things that actually don't necessarily cost very much but just I hope demonstrate greater attention to detail."[69] As the MTA has attributed approximately 30 percent of all delays in December 2018 to "Operating Environment," work to address these delays must continue.[70]

[68] "TAC Prep" analysis, "Variance Analysis Supplementary Information," October 10, 2017, included in materials prepared in advance of the Transit Committee's October 2017 meeting.

[69] *See* NYCT President's Oral Remarks after approval of minutes during December 2018 Transit Committee Meeting. Included in these remarks was President Andy Byford's thanks to the PAU employees for playing an important role in performing the analysis behind the MTA's "Save Safe Seconds," which President Byford has credited for significant delay reductions achieved in late 2018.

[70] MTA delay statistics reported for December 2018 attributed 16,523 delays to "Operating Environment" out of a total of 67,952 delays reported for that month, equaling 30.6 percent.

III. Recommendations

Based on the findings set forth in this report, the Comptroller's Office recommends that the MTA:

1. Structure public reporting of performance information to maximize transparency, reliability, and accountability and, as part of this effort, report all delays on its subway performance Dashboard.
2. Publish detailed definitions of all delay categories, specifically indicating what each one includes and, as necessary, omits.
3. Ensure that all procedures relevant to performance reporting are formally codified in official policies and procedures, including establishing written definitions and instructions for all key terms, data categories, and work protocols.
4. Train all relevant personnel on procedures relevant to performance reporting.
5. In the context of public reports of Major Incidents, provide the public with information about all categories of service disruptions that cause 50 or more delays tracked as incidents within SIRS, including specifically Planned Work.
6. Transparently disclose in each Monthly Operations Report and on the MTA's subway performance Dashboard the methodologies used to calculate performance metrics, including all exceptions and revisions to those methodologies and methodological weaknesses.
7. Make available each month on the MTA's website or through an Open Data portal all data in the SIRS database and any other databases relied on for public reporting.

Appendix I - Heat Maps

Example SIRS Heat Maps, January 2015 through January 2018 data, included in “TAC Prep” materials prepared in advance of the MTA Transit Committee’s February 2018 meeting.

SIRS Heat Map: Delays per Weekday, Sys m, Peak & Off-Peak

DRAFT

January 2018

Sys

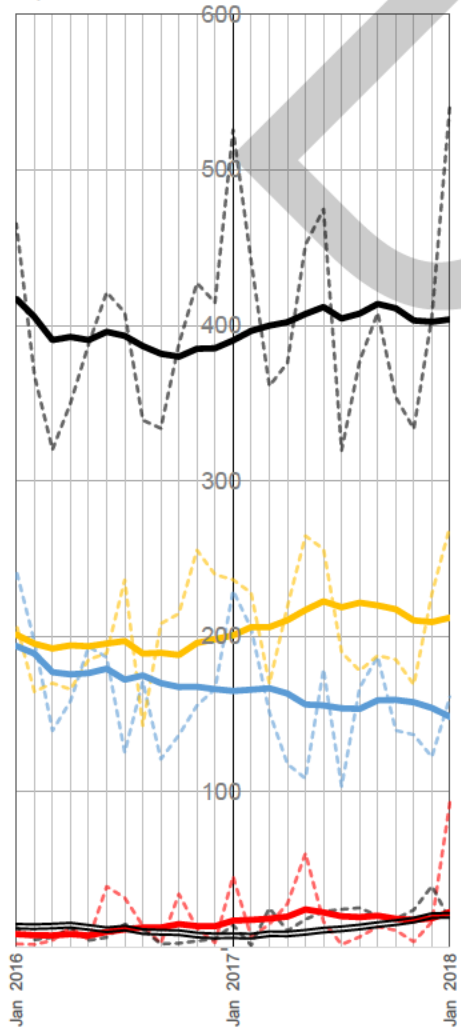
	Unplanned R				Work	Other Internal							Incidents / Temporary Disruptions											
	Internal				External																	Operating Environment			
	Track	Infrastru E Electrical, E MOW Eng.	CPM, MCC	Total Unplanned ROW	Stations	ipment	Service Delivery	Operations Training Probationary Crews)	T, OP, Revenue	Unknown Cause	Total Other Internal	Total Internal	Sick/Injured Customer	Persons on ROW	Public Conduct, Crime, Police Response	Passenger-Related (Other)	Power Utility	Inclement Weather	Other External	Total External	Total Incidents, Disruptions	Insufficient Capacity, Excess Dwell, Unknown	Planned ROW Work	Total Operating Environment	Grand Total
	1	3	4	5	6		8			11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Trend																									
This Year vs. Last Year	(17)	11	13	13		(7)	2	1		5	3	16	(22)	0	(2)	(0)	6	24	(0)	6	22	345	119	464	487
	-10%	6%	75%		%	-8%		6%	30%	1%	2%	3%	-17%	1%	-1%	0%	95%	89%	-2%	1%	2%	43%	23%	35%	21%
This Year vs. Two Years Ago	(45)	11	14		4	5		6	(1)		27	14	(12)	19	(7)	(6)	(0)	10	(4)	(0)	14	580	165	745	759
	-23%	5%	166%	53	-3%	170%	6%	%	64%	-32%	19%	3%	-11%	70%	-5%	-9%	0%	25%	-23%	0%	1%	103%	34%	71%	38%
January 2018																									
This Month vs. 12 Month	13	59	71	(3)	139	0	2)	2	7)	(1)	(12)	9)	120	18	23	(17)	14	(2)	158	(6)	189	309	87	58	145	454
	9%	28%	311%	-16%	34%		-3%	7%		-20%	-38%	%	21%	17%	51%	-12%	26%	-16%	310%	-37%	45%	31%	8%	9%	8%	16%
This Month vs. Last Month	39	43	77	(22)	137		21	(2)		(1)		9	146	2	37	(17)	28	10	184	(1)	244	390	(123)	72	(51)	339
	32%	19%	472%	-56%	34%	%	35%	-7%				6%	27%	2%	118%	-13%	70%	-	759%	-9%	68%	43%	-9%	11%	-3%	12%
This Month vs. 12 Months Ago	(68)	34	48	3	17	2	18	5			)	(4)	13	3	(8)	(28)	6	(4)	153	(23)	99	111	310	192	502	614
	-30%	15%	104%	22%	3%	56%	29%	18%		-37%	-60%	-3%	2%	2%	-10%	-19%	10%	-30%	272%	-70%	20%	9%	34%	38%	35%	23%
Monthly Data																									
1/2015	205	202	9	2	419	2	79	25		1	14	131	551			200	61	25	80	11	540	1,090	331	367	698	1,789
2/2015	255	236	10	7	508	6	90	23		7	30	169	6			242	57	16	208	20	696	1,373	442	395	837	2,211
3/2015	283	206	7	2	498	3	58	19		8	18	117		144	4	225	69	27	65	10	564	1,178	444	418	862	2,040
4/2015	176	142	3	6	327	2	67	26	3	5	17		8	133	19	145	45	6	14	37	398	856	516	482	998	1,854
5/2015	184	191	15	21	411	2	49	26	0	3			532	11	18	113	50	19	5	28	346	878	575	496	1,071	1,949
6/2015	154	168	11	25	358	4	58	35	3	3		25	483	1	37	111	64	-	17	23	366	849	553	508	1,060	1,909
7/2015	209	216	13	3	440	3	101	28	7			9	599		46	99	43	37	6	30	374	973	508	512	1,020	1,993
8/2015	140	241	0	37	418	0	84	32			24		568		33	93	29	22	5	18	290	858	506	489	994	1,852
9/2015	180	202	2	8	393	2	84	33	6	7	27	1	553		21	91	54	6	12	24	307	860	615	504	1,119	1,979
10/2015	167	231	8	6	411	2	85	35	5	2	14	143	4		30	109	6	1	23	23	408	962	653	529	1,182	2,144
11/2015	153	164	28	22	366	1	84	27	2	3	16	132		0	18	169			17	9	429	927	709	492	1,202	2,129
12/2015	185	209	4	12	411	2	93	25	13	1	16	149	5	00	23	136			35	10	383	943	634	455	1,089	2,031
1/2016	242	208	2	13	466	1	91	20	5	2	23	142	60	112	27	151	5		81	4	434	1 041	629	472	1 101	2 142
12-mo (two years ago)	***194***	***201***	***9***	***14***	417	***2***	***79***	***27***	***9***	***4***	***20***	141	5	***118***	***27***	***1***	***59***	***12***	***1***	***20***	416	975	***565***	***479***	1,045	2,019
2/2016	197	165	2	5	368	6	94	26	15	3	21	163		151	25		58	8		7	424	956	747	459	1,206	2,161
3/2016	139	170	4	6	320	6	70	18	10	3	31	137		134	24		47	9		16	416	873	715	529	1,244	2,116
4/2016	159	166	13	13	350	1	86	34	16	1	26	163		131	8		47	4	21	20	419	933	642	500	1,142	2,074
5/2016	193	185	5	5	388	4	67	29	14	2	11	127		123		1	55	-	33		397	912	676	511	1,187	2,100
6/2016	187	189	39	6	421	19	75	38	9	2	32	175	6	102		125	4	20	9	19	361	957	712	526	1,238	2,196
7/2016	125	236	32	15	408	4	106	37	15	1	27	190	98	11	5	122		9	20	8	50	948	701	545	1,246	2,194
8/2016	171	143	14	11	339	4	130	29	17	0	25	205	544		29	111		0	4	13		851	719	556	1,275	2,126
9/2016	121	208	3	2	334	3	94	22	12	2	18	151	485		44	143	4	1	21	14		871	825	576	1,401	2,272
10/2016	137	215	34	3	388	3	85	25	16	2	15	147	535		49	146	64	9	11	18	43	965	879	557	1,437	2,402
11/2016	156	255	12	4	427	2	122	29	16	1	31	201	628	129	63	129	71	-	60	13	465	4	990	463	1,452	2,546
12/2016	166	240	3	6	415	6	97	24	15	5	31	179	593	169	35	156	63	-	26	9	458		1,074	571	1,645	2,697
1/2017	229	236	46	14	526	4	63	27	7	3	50	154	680	120	77	145	61	15	56	32	506		922	510	1 433	2 619
12-mo (last year)	***165***	***201***	***17***	***8***	390	***5***	***91***	***28***	***14***	***2***	***26***	166	556	***127***	***45***	***135***	***54***	***6***	***27***	***15***	410		***800***	***525***	1,325	2,292
2/2017	205	228	7	1	442	2	81	13	12	2	29	138	580	102	22	145	68	15	118	14	4	063	90	548	1,638	2,701
3/2017	151	170	15	25	361	13	72	29	15	1	25	155	516	124	28	151	87	2	94	30		1,033		504	1,528	2,562
4/2017	118	219	28	11	376	10	84	22	14	0	47	176	552	110	39	155	51	43	41	7		998	1	610	1,656	2,655
5/2017	109	265	61	18	452	4	82	23	14	3	43	169	621	110	54	151	69	23	35	1	54	1,075	1,09	634	1,729	2,804
6/2017	179	256	17	23	475	9	85	30	14	1	68	208	683	94	49	131	38	20	12		357	1,040	1,057	663	1,719	2,759
7/2017	104	190	2	25	320	4	118	27	25	1	20	194	514	75	48	96	46	27	16		317	831	1,071	661	1,732	2,563
8/2017	167	178	7	25	377	11	101	56	13	2	22	205	582	107	43	104	47	1	20	3	345	927	1,039	712	1,751	2,678
9/2017	187	188	13	20	408	3	95	38	12	3	36	188	596	101	63	118	34	1		22	352	948	1,142	677	1,819	2,767
10/2017	140	185	11	18	354	6	80	30	13	0	18	147	501	91	65	167	53	3		15	409	910	1,211	667	1,878	2,788
11/2017	137	169	4	24	333	5	63	26	17	13	32	157	490	102	35	133	45	1		14	346	836	1,383	722	2,106	2,942
12/2017	122	227	16	39	406	5	60	35	14	3	24	141	546	121	32	134	40	-	24	11	361	907	1,356	631	1,986	2,893
1/2018	161	271	93	17	543	7	81	32	7	2	20	150	692	123	69	117	68	10	209	10	605	1 298	1 232	703	1 935	3 233
12-mo (this year)	***148***	***212***	***23***	***21***	404	***6***	***84***	***30***	***14***	***3***	***32***	169	573	***105***	***46***	***134***	***54***	***12***	***51***	***15***	416	989	***1,145***	***644***	**1,790**	**2,779**
	5%	8%	1%	1%	15%	0%	3%	1%	1%	0%	1%	6%	21%	4%	2%	5%	2%	0%	2%	1%	15%	36%	41%	23%	64%	100%

SIRS Heat Map: Delays per Weekday, Sy m, Peak & Off-Peak **DRAFT**

January 2018

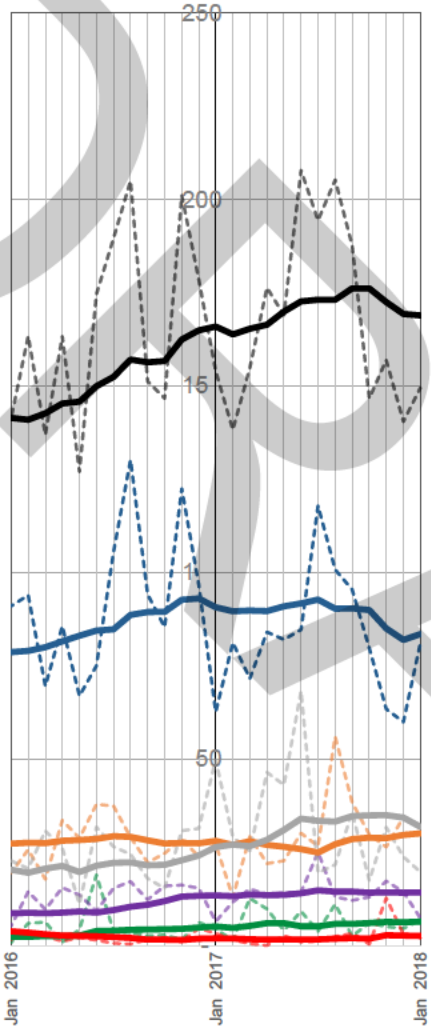
12-Month Rolling

Unplanned ROW Work



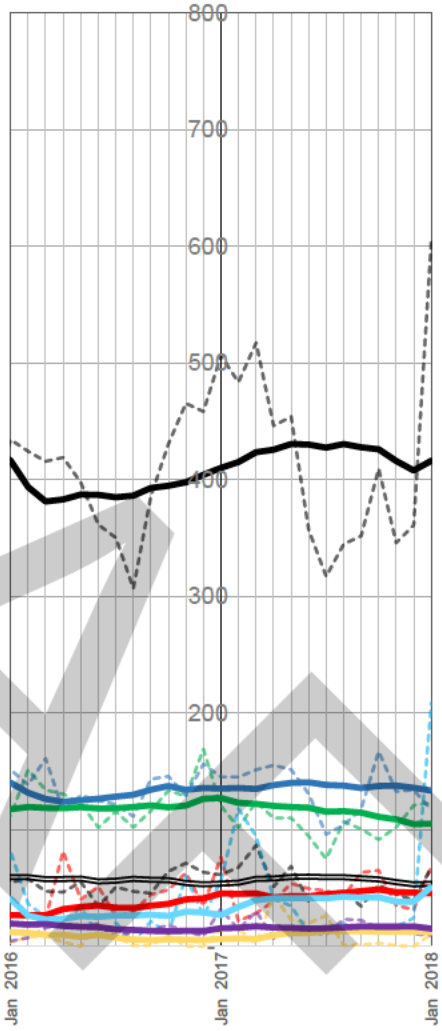
Total Unplanned ROW
Track
Signals
Infrastructure, Electrical, EMD, E&E, MOW Eng.
CPM, MCC

Oth ternal



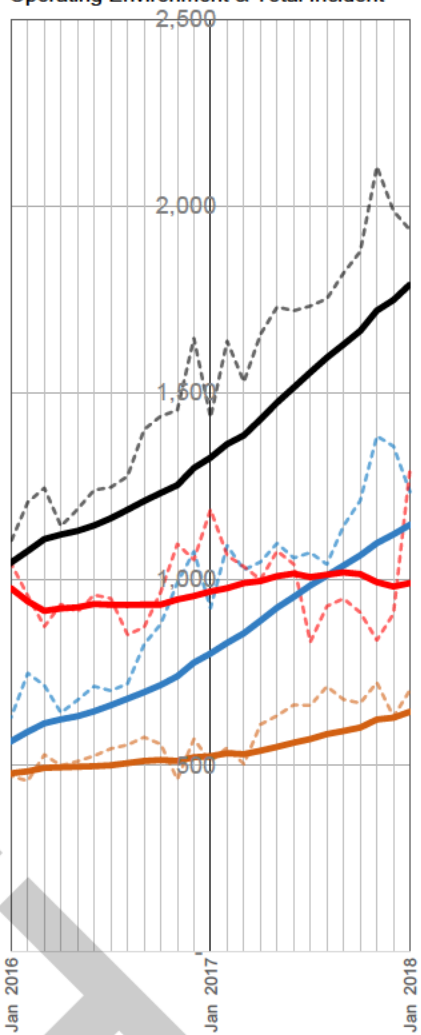
Total Internal
Stations
Car Equipment
Service Delivery
Operations Training (Probationary Crews)
IT, OP, Revenue
Unknown Cause

External



Total External
Sick/Injured Customer
Persons on ROW
Public Conduct, Crime, Police Response
Passenger-Related (Other)
Power Utility
Inclement Weather
Other External

Operating Environment & Total Incident



Opera ironment (Capacity/Dwell + Planned RO
sufficient Cap cess Dwell, Unknown
Planned ROW Wo
Total Incident Delays OW + Other Internal + External)

DRAFT

SIRS Heat Map: Incidents per Weekday, S tem, Peak & Off-Peak

DRAFT

January 2018

Sys

Incidents / Temporary Disruptions

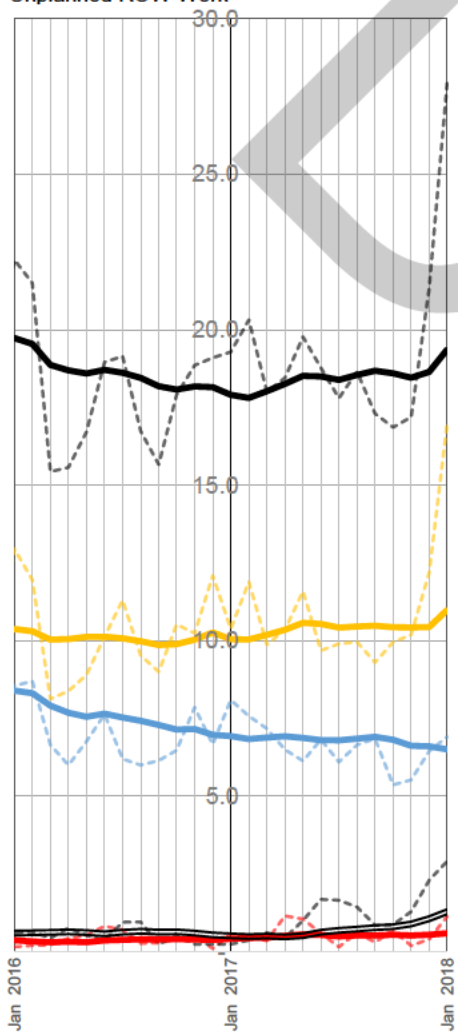
	Unplanned R			Work	Other Internal						Internal		External								Operating Environment			
	Track	Infrastru E Electrical, E MOW Eng.	CPM, MCC	Total Unplanned ROW	Stations	ipment	Service Delivery	Operations Training Probationary Crews)	T, OP, Revenue	Unknown Cause	Total Other Internal	Total Internal	Sick/Injured Customer	Persons on ROW	Public Conduct, Crime, Police Response	Passenger-Related (Other)	Power Utility	Inclement Weather	Other External	Total External	Total Incidents, Disruptions	Insufficient Capacity, Excess Dwell, Unknown	Planned ROW Work	Total Operating Environment	Grand Total
	1	3	4	5	6		8		11		12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Trend																									
This Year vs. Last Year	-0.4	0.9		0.8	1.5		-0.4	0 9	5	0	0.2	1.4	2.8	-1.1	0.0	-0.8	-1.1	0.0	0.3	0.4	-2.4	0.4	27.6	5.7	33.3	33.7
	-6%	9%		52%		%	-4%		19%	-10%	4%	6%	7%	-9%	-2%	-4%	-14%	-3%	12%	14%	-5%	1%	27%	12%	22%	14%
This Year vs. Two Years Ago	-1.9	0.6	0.2			0.3	0.8		1 6	-0.1		5 2	4 8	-0.1	0.4	-0 6	-1 3	0.0	-0.3	-0.4	-2.4	2.5	43.5	9.6	53.0	55 5
	-23%	6%	61%	116	-2%	90%	9%	%	110%	-37%		27%	12%	-1%	35%	-3%	-16%	-23%	-12%	-11%	-5%	3%	51%	21%	41%	26%
January 2018																									
This Month vs. 12 Month	0.4	6.0	0.5	1.6	8.6	0 0	8	-0.7	9	0.1	-0.4	1	8.5	0.2	0.4	-0.4	1.3	0.0	3.8	-0.6	4.6	13.0	-1.7	0.6	-1.1	11.9
	6%	55%	93%	127%	44%		18%	-8%		57%	-23%	%	19%	1%	29%	-2%	19%	-32%	161%	-19%	11%	15%	-1%	1%	-1%	4%
This Month vs. Last Month	0.5	4.8	0.7	0 6	6.6		3.0	-1 8		0 0		-0.4	6 2	-0.3	0.4	-1.1	1 8	0.1	4.7	-0.7	4 8	11.0	-15.1	3.5	-11.5	-0 5
	7%	39%	184%	26%	31%	%	36%	-19%				-2%	14%	-3%	22%	-6%	29%	-	335%	-21%	11%	12%	-11%	7%	-6%	0%
This Month vs. 12 Months Ago	-1.2	6.6	0.6	2.7	8.7	0.1	2.4	1 2			5	3.7	12.4	-1.8	0.0	-3.7	-0.4	-0.1	1.9	0.1	-4 0	8.4	23.2	8.0	31.2	39 6
	-15%	64%	99%	1122%	45%	17%	27%	18%		34%	-28%	18%	31%	-14%	3%	-17%	-5%	-62%	45%	5%	-8%	9%	22%	17%	21%	16%
Monthly Data																									
1/2015	8.5	10.1	0.5	0.2	19.4	0.4	7.6	4.9		0 2	0 8	15.6	35.0			30.8	6.3	0.2	4 9	2.6	56.8	91.7	63.4	39.2	102 6	194.3
2/2015	9.7	12 8	0.7	0.5	23.7	0 6	10.5	6.7		0 5	1.1	21.9	45			33.5	8.8	0.2	9 6	4.5	70.5	116.2	72 5	38.7	111 2	227.3
3/2015	11.5	11.4	0.5	0.3	23.6	0 6	7.5	4.6		0 5	1 0	16.0		13.2	9	32.5	8.4	0.2	4.7	2.0	61.8	101.4	70 5	42.2	112.7	214.1
4/2015	8.7	8 2	0.2	0.5	17.7	0.4	7.2	6.6	5	0 6	1 2		1	12.5	.1	22.4	7.8	0.2	1 5	4.4	49.9	86.0	86 5	46.8	133 3	219.3
5/2015	8.3	8 0	0.8	0.8	17.9	0 6	6.8	7.5	9	0 3			36.0	11	0 8	17.0	8.1	0.2	0 5	5.8	43.4	79.3	96 8	48.1	144 8	224.1
6/2015	6.5	10.1	0.1	0.9	17.5	0 5	8.3	7.9	.0	0 3		0.0	37.5	10	1.4	14.5	8.9	-	1 5	4.4	40.7	78.2	89 3	47.7	137 0	215.2
7/2015	7.6	11 9	0.5	0.3	20.3	0 5	10.5	7.9	.1		3	6	42.0		1 3	13.5	6.0	0.5	0 6	4.5	35.5	77.5	84 3	46.6	130 9	208.3
8/2015	7.3	10.7	0.0	0.7	18.7	0 2	8.6	8.9	1.3		1.1		39.0		1 0	12.9	5.0	0.3	0.7	4.4	33.4	72.5	80.4	45.8	126 2	198.7
9/2015	7.8	10 5	0.2	0.5	19.0	0 2	9.4	7.4	1.0	0 6	1.4	20	39.0		1 0	12.1	6.8	0.1	1 3	4.9	35.4	74.4	91 5	43.7	135 2	209.6
10/2015	8.2	10 2	0.3	0.5	19.2	0 3	9.9	6.3	0.8	0.1	1 0	18.4	5		1 2	15.1	9	0.0	2.1	2.3	42.1	79.7	91 3	44.9	136 2	215.9
11/2015	7.7	8 5	0.7	0.8	17.6	0 2	9.7	5.6	0.8	0 2	1.4	17.7		8	0 9	18.7	1		1 6	2.3	45.1	80.4	96.4	43.3	139 6	220.0
12/2015	9.0	9.4	0.2	0.9	19.4	0.4	9.0	5.8	0.9	0.1	0 8	17.0	3	.7	1.1	20.0			3.1	2.0	46.4	82.8	87 5	43.5	131 0	213.8
1/2016	8.6	13 0	0.2	0.6	22.3	0 2	9.7	5.4	0.7	0.1	1 3	17.3	39	1.0	1 5	20 6	4	0	4.7	1.5	46.8	86.4	82 3	44.5	126 8	213.1
12-mo (two years ago)	***8.4***	***10.4***	***0.4***	***0.6***	19.7	***0.4***	***8.9***	***6.7***	***1.4***	***0.3***	***1.1***	18.9	3	***10.9***	***1.1***	***1***	***8.1***	***0.2***	***7***	***3.6***	45.9	84.5	***85.8***	***44.6***	130.4	214.9
2/2016	8.7	12 0	0.2	0.7	21.5	0.7	9.7	5.9	1.4	0 3	1 2	19.1	4	13.3	1 5		9.0	0.2		1.5	45.6	86.1	98 6	44.6	143.1	229.2
3/2016	6.7	8.1	0.2	0.4	15.4	0 3	9.6	6.1	2.1	0 2	1.7	20.0		13.2	1 2		7.9	0.1	2	2.1	48.8	84.3	96.7	49.3	146.1	230.3
4/2016	6.0	8.4	0.4	0.8	15.6	0 5	8.9	6.9	2.1	0 2	1 6	20.1		12.9	1		8.0	0.1	2 0	.1	46.6	82.3	93 2	49.6	142 8	225.1
5/2016	6.8	8 9	0.5	0.5	16.7	0 5	7.8	7.8	2.7	0 3	1 2	20.2		12.4		20	8.4	-	2 8	0	49.0	86.0	95 5	49.3	144 9	230.8
6/2016	7.6	10.1	0.8	0.4	19.0	0 8	10.0	10.0	2.3	0 3	1 6	24.9	8	9.5		19.4	7	0.3	0.7	3.7	40.9	84.7	95.4	49.4	144 8	229.5
7/2016	6.2	11 3	0.7	1.0	19.2	0.7	12.3	11.3	2.5	0 2	2 0	28.9	8.0	9	3	17.0		0.3	1 5	2.4	9 3	87.3	93 3	50.7	144 0	231.2
8/2016	6.0	9 5	0.3	1.0	16.7	0 5	14.7	8.7	3.0	0.1	1 5	28.5	45.3		0 8	16.6		0.1	0 6	3.0		82.7	100 9	51.3	152.1	234.8
9/2016	6.1	9 0	0.3	0.2	15.7	0 5	10.0	7.0	2.3	0.1	1.4	21.3	37.0		1.4	19.0	6.	0	1 6	3.4		80.0	101 2	53.0	154 2	234.2
10/2016	6.5	10 5	0.4	0.5	17.9	0 8	9.4	8.0	3.4	0 3	1 5	23.4	41.3	0	1 9	20.0	7.6	3	1 0	3.5	46	87.7	105 0	50.3	155 3	243.0
11/2016	7.9	10 2	0.5	0.2	18.9	0.7	8.9	7.6	3.9	0.1	1 8	23.0	41.9	13.0	2 0	19.8	9.2	-	3 9	2.6	50.5	3	115.4	40.7	156.1	248.5
12/2016	6.7	12.1	0.1	0.2	19.1	0.7	10.5	6.8	2.9	0.4	1.7	23.0	42.0	14.0	1.4	22.1	9.2	-	2 5	2.8	52.0		119 9	47.6	167 5	261.6
1/2017	8.1	10.4	0.6	0.2	19.3	0 6	9.0	6.8	1.6	0 2	2 0	20.2	39.5	12.7	1 9	22.1	8.5	0.2	4 2	2.5	52.1		104 3	46.8	151.1	242.7
12-mo (last year)	***6.9***	***10.0***	***0.4***	***0.5***	17.9	***0.6***	***10.1***	***7.7***	***2.5***	***0.2***	***1.6***	22.7	40.6	***11.9***	***1.5***	***19.6***	***7.9***	***0.1***	***2.1***	***2.8***	46.0		***101.6***	***48.5***	150.2	236.7
2/2017	7.6	11 9	0.5	0.4	20.3	0 5	8.6	4.7	3.2	0 3	1 6	18.9	39.3	11.9	1 3	20.2	9.3	0.2	3 6	2.5	48	8.1	3 5	46.1	169 5	257.6
3/2017	7.2	9 9	0.3	0.6	18.0	1.1	8.6	7.1	2.9	0 0	1 5	21.3	39.3	12.2	1 6	20.8	10.3	0.2	4.1	2.3		90.8		43.6	162 6	253.4
4/2017	6.5	10.4	1.2	0.5	18.5	0.7	9.0	6.8	3.5	0.1	1 8	21.8	40.2	11.6	1 5	19.3	8.3	0.2	3 2	1.7		85.9	1	52.0	178 6	264.5
5/2017	6.1	11 6	1.0	1.0	19.8	0 6	8.1	7.9	3.4	0 2	2 6	22.8	42.5	12.0	1 5	19.3	5.9	0.2	2.4	3	.1	86.7	128	52.4	180.4	267.1
6/2017	6.8	9.7	0.6	1.7	18.8	0.7	9.7	9.0	3.6	0.1	2 2	25.3	44.1	10.8	1 5	17.8	5.7	0.3	0.7		40.2	84.3	123 8	56.6	180 5	264.7
7/2017	6.1	9 9	0.2	1.7	17.8	0.7	12.3	9.7	3.1	0.1	1.7	27.5	45.3	8.3	1 3	16.0	5.4	0.2	1 6		35.7	81.0	129 8	58.0	187 8	268.7
8/2017	6.7	10 0	0.6	1.4	18.7	0.7	12.1	12.0	2.5	0 2	1 5	29.0	47.6	9.3	1.7	16.4	5.3	0.1	1 6		39.0	86.6	119 5	62.5	182 0	268.6
9/2017	6.9	9 3	0.3	0.9	17.3	0 6	9.4	10.1	3.2	0 3	1 9	25.3	42.6	10.2	1 9	18.6	4.7	0.1		4.2	40.6	83.2	129.4	58.9	188 3	271.5
10/2017	5.4	10 0	0.7	0.9	16.9	0.7	10.0	9.9	2.5	0.1	1 9	25.0	41.9	10.5	1 0	20.4	6.4	0.1		4.0	43.8	85.7	134 3	58.1	192.4	278.0
11/2017	5.5	10 2	0.2	1.3	17.2	0 9	8.7	8.5	3.5	0 5	1 9	23.9	41.1	10.6	1.4	19.4	5.9	0.1		3.6	41.9	83.0	146 9	56.3	203 2	286.2
12/2017	6.5	12 2	0.4	2.3	21.4	1 0	8.5	9.8	2.8	0.4	2 0	24.4	45.7	11.3	1 6	19.5	6.3	-	.4	3.3	43.4	89.1	142 6	51.3	193 9	282.9
1/2018	6.9	17 0	1.1	2.9	28.0	0.7	11.5	8.0	2.1	0 3	1.4	24.0	51.9	11.0	2 0	18.4	8.0	0.1	6.1	2.6	48.1	100.0	127 5	54.8	182 3	282.4
12-mo (this year)	***6.5***	***11.0***	***0.6***	***1.3***	19.4	***0.7***	***9.7***	***8.6***	***3.0***	***0.2***	***1.8***	24.1	43.5	***10.8***	***1.5***	***18.8***	***6.8***	***0.1***	***2.3***	***3.2***	43.6	87.0	***129.2***	***54.2***	***183.4***	***270.5***
	7%	13%	1%	1%	22%	1%	11%	10%	3%	0%	2%	28%	50%	12%	2%	22%	8%	0%	3%	4%	50%	100%				

SIRS Heat Map: Incidents per Weekday, S tem, Peak & Off-Peak **DRAFT**

January 2018

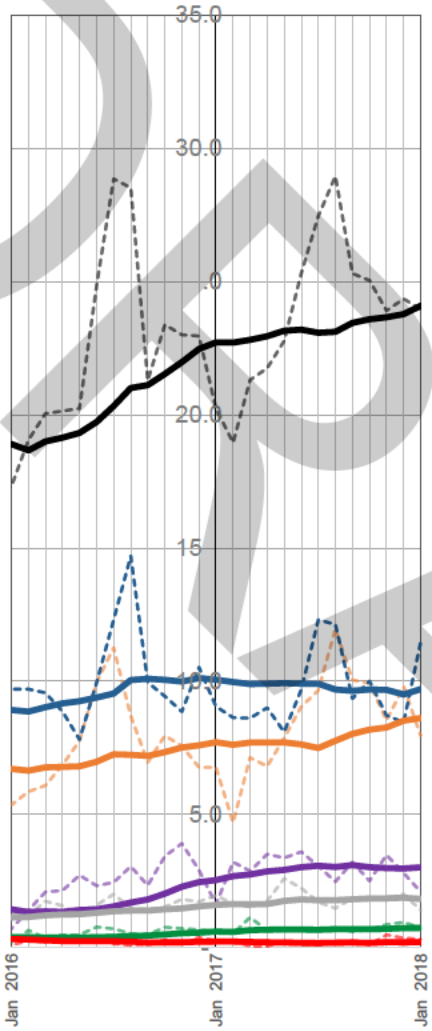
12-Month Rolling

Unplanned ROW Work



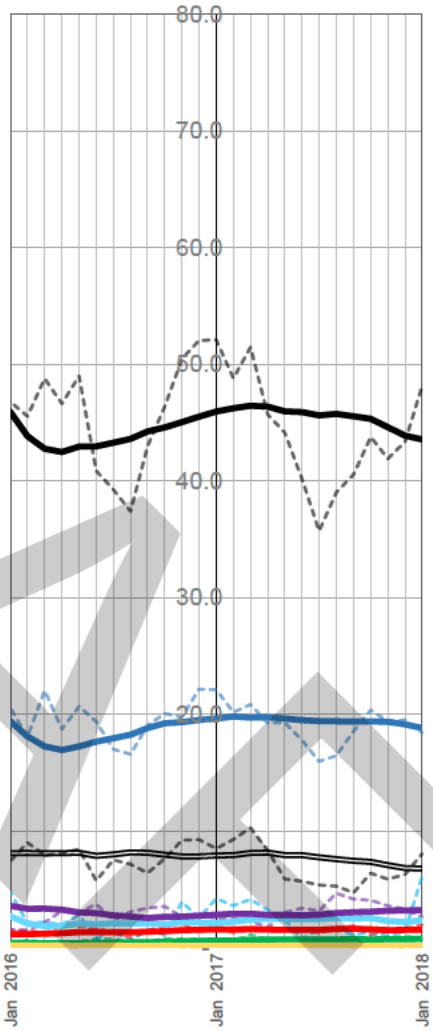
Total Unplanned ROW
Track
Signals
Infrastructure, Electrical, EMD, E&E, MOW Eng.
CPM, MCC

Oth ternal



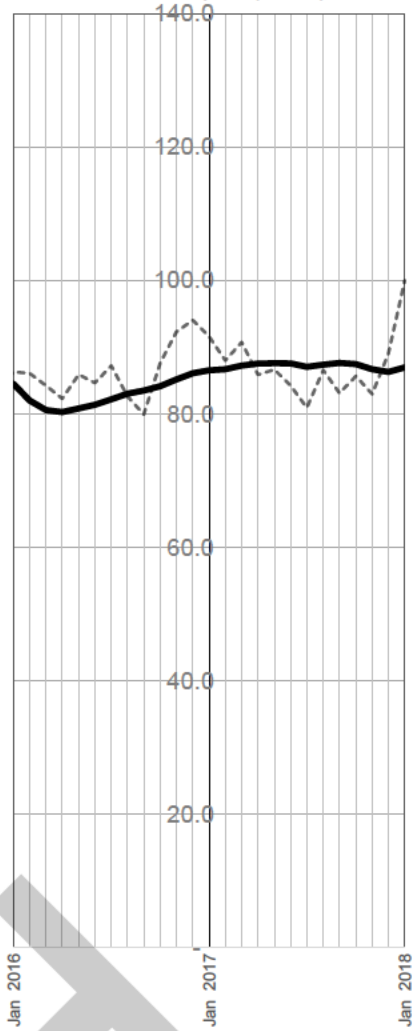
Total Internal
Stations
Car Equipment
Service Delivery
Operations Training (Probationary Crews)
IT, OP, Revenue
Unknown Cause

External



Total External
Sick/Injured Customer
Persons on ROW
Public Conduct, Crime, Police Response
Passenger-Related (Other)
Power Utility
Inclement Weather
Other External

Total Incidents / Temporary Disruptions



Incide ptions

DRAFT

SIRS Heat Map: Delays per Incident, Syst , Peak & Off-Peak — **DRAFT**

January 2018

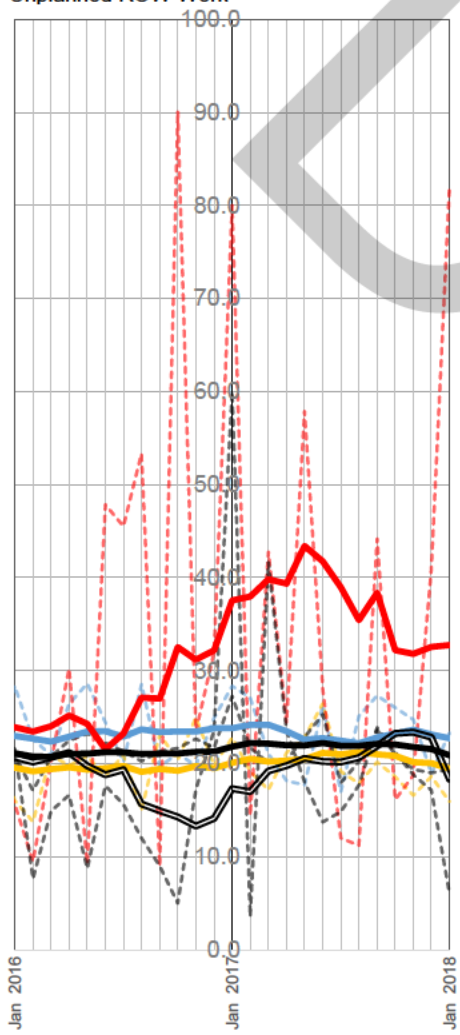
Sys

	Unplanned R				Work	Other Internal							Incidents / Temporary Disruptions: External										Operating Environment			
	Track	Infrastru E Electrical, E MOW Eng.	CPM, MCC	Total Unplanned ROW	Stations	ipment	Service Delivery	Operations Training Probationary Crews)	T, OP, Revenue	Unknown Cause	Total Other Internal	Total Internal	Sick/Injured Customer	Persons on ROW	Public Conduct, Crime, Police Response	Passenger-Related (Other)	Power Utility	Inclement Weather	Other External	Total External	Total Incidents, Disruptions		Insufficient Capacity, Excess Dwell, Unknown	Planned ROW Work	Total Operating Environment	Grand Total
	1	3	4	5	6		8			11	12	13	14	15	16	17	18	19	20	21	22		23	24	25	26
Trend																										
This Year vs. Last Year	-1.0	-0.7		1.4	-1.0		-0.4	-0 2	6	3	1.0	-0.3	-0.5	-1.0	0.8	0.2	1.1	46.0	8.9	-0.8	0.6	0.2	#	1.0	1.1	0.9	0.6
	-4%	-3%		9%		%	-5%		11%	43%	6%	-4%	-4%	-9%	3%	3%	16%	102%	69%	-14%	7%	2%		13%	10%	11%	6%
This Year vs. Two Years Ago	-0.3	-0.1	15.2			2.6	-0.2		-1 3	0.8		-0 5	-1 3	-1.1	6.3	-0.1	0 6	21.1	6.6	-0.7	0 5	-0.2	#	2.3	1.1	1.7	0 9
	-1%	0%	65%	-29	-1%	42%	-2%	%	-22%	7%		-6%	-9%	-10%	26%	-2%	8%	30%	43%	-13%	5%	-1%		34%	11%	22%	9%
January 2018																										
This Month vs. 12 Month	0.5	-3.4	43.6	-10.1	-1.4	0 7	5	0.6	2	-6.3	-3.4	8	0.2	1.5	5.1	-0.7	0.5	20.9	12.5	-1.1	3.0	1.6	#	0.8	0.9	0.9	1.2
	2%	-17%	113%	-63%	-7%		-18%	16%		-49%	-20%	%	1%	16%	17%	-10%	6%	23%	57%	-23%	32%	14%		9%	8%	9%	11%
This Month vs. Last Month	4.3	-2.7	41.4	-11 2	0.4		0.0	0 5		2 3		0 5	1.4	0.6	15.5	-0 5	2 0		16.9	0.5	4 2	2.8	#	0.2	0.5	0.4	1 2
	23%	-15%	101%	-65%	2%	%	0%	15%				8%	12%	5%	78%	-8%	32%	-	97%	16%	51%	27%		2%	4%	4%	12%
This Month vs. 12 Months Ago	-5.0	-6.8	2.2	-54 0	-7.8	2.3	0.2	0 0				-1.4	-3 9	1.8	-5.0	-0 2	1 2	51.0	20.9	-9.3	2 9	0.0	#	0.8	1.9	1.1	0.7
	-18%	-30%	3%	-90%	-29%	33%	2%	1%		-53%	-45%	-18%	-22%	19%	-12%	-3%	16%	84%	156%	-72%	29%	0%		9%	18%	12%	6%
Monthly Data																										
1/2015	24.1	20 0	17.9	10.2	21.6	4.4	10.4	5.2		5 8	18.7	8.4	15.8			6.5	9.7	104.4	16 3	4.1	9.5	11.9		5 2	9.4	6 8	9.2
2/2015	26.2	18 5	15.0	13.7	21.4	9 9	8.6	3.4		14 9	28 8	7.7	1			7.2	6.5	99.3	21.7	4.4	9.9	11.8		6.1	10.2	7 5	9.7
3/2015	24.7	18.1	13.4	8.8	21.1	5 3	7.7	4.0		14 0	18.7	7.3		10.9	9	6.9	8.1	150.3	13.7	5.1	9.1	11.6		6 3	9.9	7 6	9.5
4/2015	20.1	17 3	16.5	10.4	18.5	5 5	9.3	3.9	4	9.1	14 2		7	10.7	6.7	6.5	5.8	24.2	8 8	8.5	8.0	10.0		6 0	10.3	7 5	8.5
5/2015	22.1	23 9	20.0	25.9	23.0	4.1	7.2	3.5	4	9 3	29		14.8	10	22.4	6.7	6.2	97.3	10 5	4.8	8.0	11.1		5 9	10.3	7.4	8.7
6/2015	23.8	16.7	80.7	29.1	20.4	7 8	7.0	4.4	4	10 9		6.3	12.9	11	26 3	7.6	7.2	n/a	10.7	5.2	9.0	10.9		6 2	10.6	7.7	8.9
7/2015	27.3	18.1	25.0	9.2	21.6	4 9	9.7	3.6	6.5		9		14.3	1	35 0	7.3	7.2	82.0	10 0	6.6	10.5	12.6		6 0	11.0	7 8	9.6
8/2015	19.2	22 6	7.0	56.2	22.4	2 5	9.8	3.5	5		20 6		14.5		33 3	7.2	5.7	76.2	8 2	4.0	8.7	11.8		6 3	10.7	7 9	9.3
9/2015	23.1	19 3	10.2	17.6	20.7	8 8	9.0	4.5	6.1	2 3	19 0	8	14.2		21 5	7.5	7.9	42.3	9 2	5.0	8.7	11.6		6.7	11.5	8 3	9.4
10/2015	20.3	22 6	24.0	13.1	21.4	6.7	8.6	5.6	5.7	16 0	14.1	7.8	7		25 2	7.2	7	8.0	10 6	9.9	9.7	12.1		7.1	11.8	8.7	9.9
11/2015	20.0	19 2	39.6	29.0	20.8	5 3	8.7	4.8	2.3	14 0	12 0	7.5		2	19 8	9.0			10 8	3.8	9.5	11.5		7.4	11.4	8 6	9.7
12/2015	20.7	22 3	20.0	13.6	21.2	5.1	10.3	4.4	14.0	4.7	19 6	8.8	1	.3	19 9	6.8			11 3	5.3	8.3	11.4		7 2	10.5	8 3	9.5
1/2016	28.4	16 0	15.7	21.7	20.9	6 3	9.4	3.7	7.6	17 5	17 5	8.2	15	0.2	17 9	7 4	4	17	7 3	3.0	9.3	12.1		7 6	10.6	8.7	10.1
12-mo (two years ago)	***23.1***	***19.4***	***23.4***	***22.8***	21.1	***6.2***	***8.8***	***4.1***	***6.1***	***12.1***	***18.0***	7.5	1	***10.8***	***23.9***		***7.3***	***70.0***		***5.5***	9.1	11.5		***6.6***	***10.7***	8.0	9.4
2/2016	22.6	13 8	9.5	7.6	17.1	9 2	9.7	4.4	10.4	10 0	17 3	8.6		11.4	17 0		6.4	40.0		5.1	9.3	11.1		7 6	10.3	8.4	9.4
3/2016	20.9	20 9	20.2	14.9	20.7	18 3	7.3	2.9	4.7	12 0	17.7	6.8		10.2	19.7		6.0	67.7	1	7.4	8.5	10.4		7.4	10.7	8 5	9.2
4/2016	26.4	19 8	30.2	16.6	22.5	2.1	9.7	4.9	7.3	5 2	16.7	8.1		10.2	45		5.8	39.0	10.7	2	9.0	11.3		6 9	10.1	8 0	9.2
5/2016	28.6	20 8	9.3	8.7	23.2	9.1	8.6	3.7	5.0	7 5	9.4	6.3		9.9		6	6.5	n/a	12.1		8.1	10.6		7.1	10.4	8 2	9.1
6/2016	24.4	18.7	47.8	17.6	22.2	24 6	7.5	3.8	4.0	5 5	20 0	7.0	6	10.7		6.4	0	74.8	12.7	5.2	8.8	11.3		7 5	10.6	8 6	9.6
7/2016	20.2	20 9	45.5	15.6	21.3	5 5	8.6	3.3	6.3	4.7	13 3	6.6	2.5	12	6	7.2		28.7	13.4	3.3	8.9	10.9		7 5	10.8	8.7	9.5
8/2016	28.5	15 0	53.3	12.0	20.3	6 8	8.9	3.3	5.7	5 0	16 6	7.2	12.0	1	37 5	6.7		5.5	6 8	4.2		10.3		7.1	10.8	8.4	9.1
9/2016	19.7	23.1	9.0	9.0	21.3	5.7	9.5	3.2	5.3	12 0	12 6	7.1	13.1		31.1	7.5	7.	0	13.7	4.1		10.9		8.1	10.9	9.1	9.7
10/2016	21.1	20.4	90.1	5.0	21.7	3 8	9.1	3.1	4.7	7.7	10.1	6.3	13.0		26.1	7.3	8.4	8	10 5	5.1	9	1.0		8.4	11.1	9 2	9.9
11/2016	19.8	25 0	23.5	17.2	22.7	2 3	13.8	3.8	4.2	8 3	17.1	8.7	15.0	9.9	30 8	6.5	7.8	n/a	15 5	4.9	9.2	8		8 6	11.4	9 3	10.2
12/2016	24.9	19 8	32.0	23.6	21.7	9.4	9.2	3.5	5.3	12.4	18 3	7.8	14.1	12.1	25 0	7.1	6.9	n/a	10.4	3.2	8.8			9 0	12.0	9 8	10.3
1/2017	28.3	22 8	80.0	60.0	27.3	7 2	6.9	4.0	4.0	14 0	25 5	7.6	17.2	9.5	40 2	6.6	7.2	61.0	13.4	13.0	9.7			8 8	10.9	9 5	10.8
12-mo (last year)	***23.8***	***20.0***	***41.3***	***14.7***	21.8	***8.6***	***9.0***	***3.6***	***5.3***	***9.0***	***16.5***	7.3	13.7	***10.7***	***29.3***	***6.9***	***6.8***	***45.1***	***12.9***	***5.5***	8.9			***7.9***	***10.8***	8.8	9.7
2/2017	27.1	19 2	14.4	3.6	21.7	2 9	9.4	2.8	3.7	6 0	17 9	7.3	14.8	8.6	17.1	7.2	7.3	96.0	32 9	5.8	9	2.1		8 8	11.9	9.7	10.5
3/2017	21.1	17 2	42.8	41.6	20.1	11 2	8.3	4.1	5.3	13 0	16.7	7.3	13.1	10.2	17.7	7.3	8.4	13.0	22 9	13.1		11.4			11.6	9.4	10.1
4/2017	18.2	21 2	24.4	23.6	20.4	15 2	9.3	3.2	3.9	2 0	26 6	8.1	13.7	9.5	25 8	8.1	6.2	217.3	12.7	4.2		11.6			11.7	9 3	10.0
5/2017	17.7	22 8	57.9	18.0	22.9	6.4	10.1	2.9	4.2	12 0	16 6	7.4	14.6	9.2	37.1	7.9	11.7	124.8	14.7	4	.3	12.4		8	12.1	9 6	10.5
6/2017	26.3	26 5	28.0	13.7	25.3	13 5	8.8	3.3	4.0	11 5	30.7	8.2	15.5	8.7	32 0	7.4	6.8	73.0	15 9		8.9	12.3		8 5	11.7	9 5	10.4
7/2017	17.0	19 2	12.0	14.8	18.0	6 0	9.6	2.8	8.2	12 0	11 5	7.1	11.4	9.1	38 2	6.0	8.5	132.5	10 5		8.9	10.3		8 2	11.4	9 2	9.5
8/2017	25.1	17 9	11.2	17.7	20.2	15.1	8.3	4.7	5.3	14 3	14.7	7.1	12.2	11.4	25 9	6.3	8.9	9.0	12 6	0	8.8	10.7		8.7	11.4	9 6	10.0
9/2017	27.3	20 2	44.2	23.9	23.6	4 3	10.2	3.8	3.8	13 2	19.4	7.4	14.0	9.9	34 3	6.4	7.3	27.0	1	5.4	8.7	11.4		8 8	11.5	9.7	10.2
10/2017	26.0	18 6	16.1	21.2	21.0	9 0	8.0	3.0	5.2	5 0	9.4	5.9	11.9	8.7	62 3	8.2	8.3	32.0		3.8	9.4	10.6		9 0	11.5	9 8	10.0
11/2017	24.8	16 6	18.8	18.8	19.4	6 0	7.3	3.1	5.0	26 9	17.1	6.6	11.9	9.7	24 5	6.9	7.6	6.5		3.9	8.3	10.1		9.4	12.8	10.4	10.3
12/2017	19.0	18 6	40.9	17.2	19.0	4 9	7.1	3.5	5.1	8 9	11 9	5.8	11.9	10.7	19 8	6.9	6.4	n/	.4	3.2	8.3	10.2		9 5	12.3	10 2	10.2
1/2018	23.3	15 9	82.2	6.0	19.4	9 5	7.1	4.1	3.5	6 6	14.1	6.2	13.3	11.3	35 2	6.4	8.4	112.0	34 3	3.7	12.6	13.0		9.7	12.8	10 6	11.4
12-mo (this year)	***22.8***	***19.3***	***38.6***	***16.1***	20.9	***8.8***	***8.6***	***3.5***	***4.8***	***12.9***	***17.5***	7.0	13.2	***9.7***	***30.1***	***7.1***	***7.9***	***91.1***	***21.8***	***4.8***	9.6	11.4		***8.9***	***11.9***	9.8	10.3

January 2018

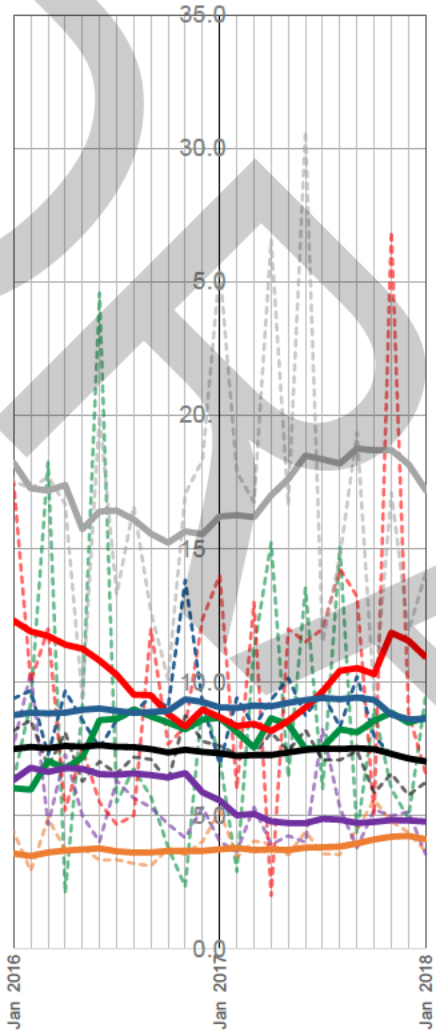
12-Month Rolling

Unplanned ROW Work



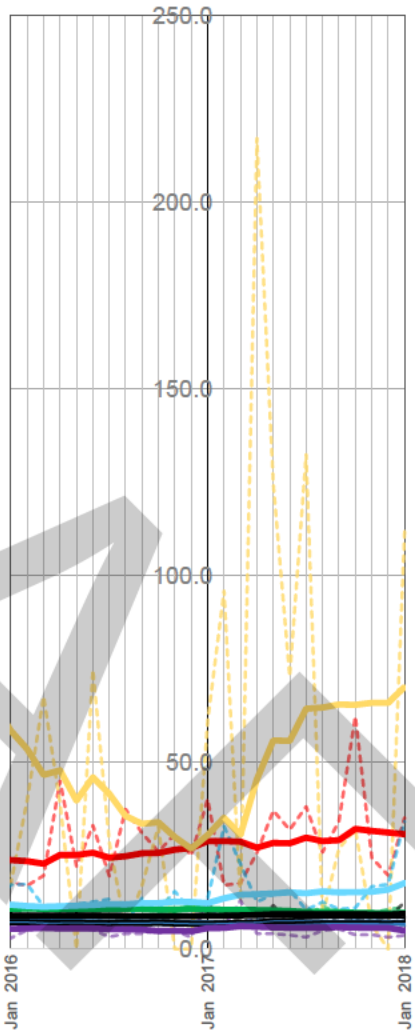
Total Unplanned ROW
Track
Signals
Infrastructure, Electrical, EMD, E&E, MOW Eng.
CPM, MCC

Oth ternal



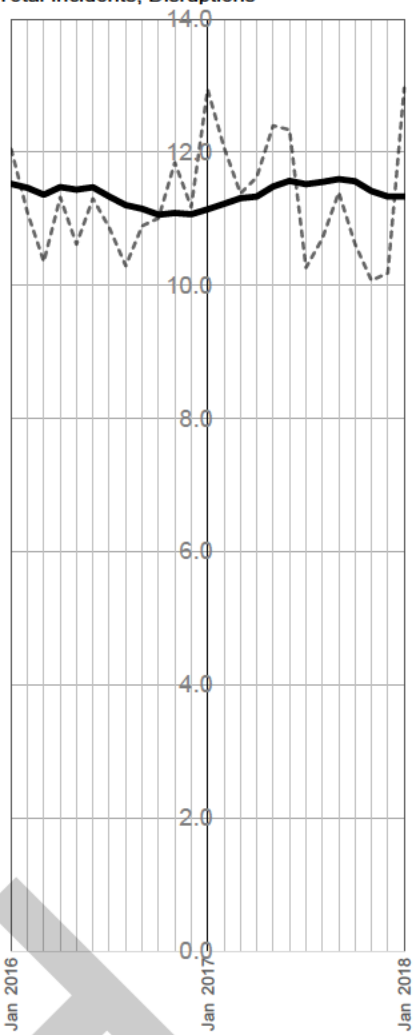
Total Internal
Stations
Car Equipment
Service Delivery
Operations Training (Probationary Crews)
IT, OP, Revenue
Unknown Cause

External



Total External
Sick/Injured Customer
Persons on ROW
Public Conduct, Crime, Police Response
Passenger-Related (Other)
Power Utility
Inclement Weather
Other External

Total Incidents, Disruptions



Incide ptions

SIRS Heat Map: Major Incident Delays per Month — stem, 50+ Delays, Weekdays Only

DRAFT

January 2018

Sys

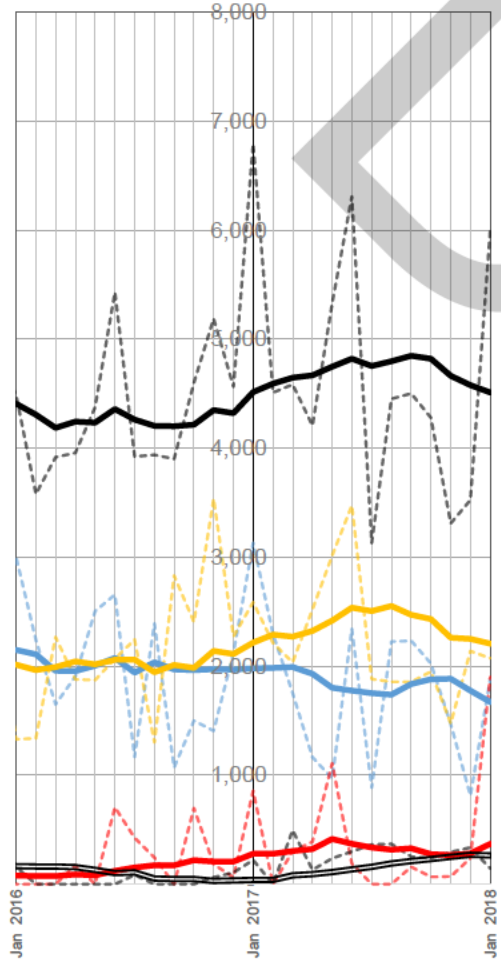
	Unplanned ROW					Other Internal							Incidents / Temporary Disruptions									Operating Environment			
	Track	Signals	ucture, EMD, E&E, MO	CPM, MCC	Total Unplanned ROW	Stations	Car Equipment	s	Operations Training (Probationary Crews)	T, OP, Revenue	Unknown Cause	Total Other Internal	Total Internal	Sick/Injured Customer	Persons on ROW	Public Conduct, Crime, Police Response	Passenger-Related (Other)	Power Utility	Inclement Weather	Other External	Total External	Total Incidents, Disruptions	Insufficient Capacity, Excess Dwell, Unknown	Planned ROW Work	Total Operating Environment	Grand Total
	1	2		4	5	6	7	8	9		11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Trend																										
This Year vs. Last Year	(308)	(9)	9	224	(3)	18		29			83	70	67	(91)	33	223	93	128	360	(32)	715	782	21	299	320	1,102
	-16%	0%	32%		0%		%	122%		200	44%	9%	1%	-22%	5%	100%	89%	129%	991%	-42%	45%	11%	378%	547%	531%	16%
This Year vs. Two Years Ago	(478)	194	290				62	22	9	(7)		277	380	(33)	326	127	87	6	268	(30)	751	1,131	7	258	265	1,396
	-22%	10%	365%	5			17%		150%	-35%		47%	8%	-9%	94%	40%	79%	3%	200%	-40%	48%	17%	36%	208%	229%	21%
January 2018																										
This Month vs. 12 Month	208	(135)	1,532	(119)	1,487	0	(15	(2)	7)	(13)	(184)	9)	1,088	222	466	(165)	(10)	(7)	2,100	(45)	2,562	3,650	(27)	679	652	4,303
	12%	-6%	416%	-45%	33%	1%		-3%		-100%	-68%	%	20%	68%	60%	-37%	-5%	-3%	530%	-100%	111%	48%	-100%	102%	171%	53%
This Month vs. Last Month	1,068	(65)	1,662	(191)	2,474	58		(40)		-	31	8	2,672	150	752	(90)	187	220	2,336	-	3,555	6,227	-	617	617	6,844
	132%	-3%	695%	-57%	70%		0%	-44%		-	54%	5%	71%	38%	194%	-24%	-	-	1450%	-	270%	122%	-	148%	148%	124%
This Month vs. 12 Months Ago	(1,251)	(513)	1,044	(76)	(796)	5	147	51				330)	(1,126)	295	(2)	139	48	(8)	2,496	(491)	2,477	1,351	-	1,033	1,033	2,384
	-40%	-20%	122%	-34%	-12%	-	126%	-				-42%	-15%	116%	0%	98%	35%	-4%	-	-100%	103%	14%	-	-	-	24%
Monthly Data																										
1/2015	2,369	1,877	74	-	4,320	-	582	53	-	-	114	749	5,069	714	348	400	205	491	163	-	2,321	7,390	198	76	274	7,664
2/2015	2,736	1,936	60	51	4,783	53	158	-	-	77	356	644	5,427	3	271	57	-	289	1,299	-	2,312	7,739	-	165	165	7,904
3/2015	3,447	1,923	-	-	5,370	-	265	-		117	113	562	5,932		9	560	109	575	53	-	2,134	8,066	129	52	181	8,247
4/2015	1,946	1,261	-	65	3,272	-	320	78		-	-	398	3	82	88	284	57	59	-	350	1,020	4,690	-	128	128	4,818
5/2015	1,918	2,192	80	303	4,493	-	119	-		-	376	49		356	237	286	-	341	-	65	1,285	6,273	-	118	118	6,391
6/2015	1,788	1,567	223	361	3,939	-	68	88		-	-		095	68	574	532	253	-	-	76	2,116	6,211	-	171	171	6,382
7/2015	2,787	2,224	64	-	5,075	-	475	-		-	1		5,687	3	874	271	121	693	-	143	2,421	8,108	-	133	133	8,241
8/2015	1,265	2,693	-	666	4,624	-	551	-	-	52		86	5,410		457	305	-	375	-	-	1,343	6,753	-	55	55	6,808
9/2015	1,850	2,045	-	57	3,952	-	682	-	-	-	6		4,900		268	123	233	111	-	-	864	5,764	-	148	148	5,912
10/2015	1,572	2,718	132	-	4,422	-	242	146	-		65		4,875		484	56	113	-	-	257	1,706	6,581	-	122	122	6,703
11/2015	1,318	1,665	341	272	3,596	-	162	50	-		-	21	808	9	126	691	2	87	-	-	1,254	5,062	-	-	-	5,062
12/2015	2,163	2,611	51	57	4,882	-	772	-	151	-	177	1,100	2	6	199	397		53	-	-	983	6,965	-	-	-	6,965
1/2016	3,004	1,329	-	158	4,491	-	461	-	-	-	174	635		22	259	268		60	189	-	1,271	6,397	106	62	168	6,565
12-mo (two years ago)	*2,150*	*2,014*	*79*	*166*	4,408	*4*	*356*	*30*	*18*	*21*	*154*	583	4,9	*360*	*347*	*31*	*10*	*0*	*128*	*74*	1,559	6,551	*20*	*96*	116	6,667
2/2016	2,242	1,338	-	-	3,580	63	561	61	182	-	75	942	4,52	336	206		177		129	-	1,330	5,852	-	-	-	5,852
3/2016	1,650	2,267	-	-	3,917	80	121	-	-	-	221	422	4,3	216	198		54		-	57	1,232	5,571	-	-	-	5,571
4/2016	1,907	1,878	172	-	3,957	-	614	-	121	-	160	895	4	446	1,365		-	7		195	2,324	7,176	-	-	-	7,176
5/2016	2,504	1,872	-	-	4,376	-	310	74	-	-	55	439		397	40		58	-		-	859	5,674	-	-	-	5,674
6/2016	2,657	2,069	706	-	5,432	274	269	-	-	-	260	803		518			-	365		-	1,830	8,065	-	-	-	8,065
7/2016	1,168	2,245	426	84	3,923	-	598	60	-	-	53	711	4	491			98	58	-	-	1,163	5,797	-	-	-	5,797
8/2016	2,392	1,302	245	-	3,939	-	648	-	-	-	187	835	4	492		-	100	-	-	-	1,109	5,883	-	108	108	5,991
9/2016	1,070	2,831	-	-	3,901	-	568	-	50	-	148	766	4,667	4	741	276	7	-	162		1,754	6,421	-	-	-	6,421
10/2016	1,500	2,404	698	-	4,602	-	489	-	-	-	-	489	5,091		669	422		146	-		1,943	7,034	67	102	169	7,203
11/2016	1,407	3,536	183	63	5,189	-	1,178	89	-	-	243	1,510	6,699		915	180		-	145	-	701	8,400	-	63	63	8,463
12/2016	2,123	2,273	62	106	4,564	58	573	-	-	-	247	878	5,442	39	404	187		-	-	-	5	6,947	-	384	384	7,331
1/2017	3 131	2 586	857	221	6 795	-	117	-	-	53	621	791	7 586	254	1 141	142	139	228	-	491		9 981	-	-	-	9 981
12-mo (last year)	*1,979*	*2,217*	*279*	*40*	4,515	*40*	*504*	*24*	*29*	*4*	*189*	790	5,305	*418*	*640*	*223*	*104*	*99*	*36*	*76*	1,	6,900	*6*	*55*	60	6,960
2/2017	2,297	2,213	-	-	4,510	-	236	-	-	-	225	461	4,971	243	160	476	52	262	1,172	55	2	391	174	322	496	7,887
3/2017	1,752	2,036	301	496	4,585	140	458	50	74	-	358	1,080	5,665	394	271	598	529	-	873	402		2	-	108	108	8,840
4/2017	1,165	2,521	390	131	4,207	96	345	51	-	-	513	1,005	5,212	307	519	725	64	822	-	-			-	67	67	7,716
5/2017	970	3,015	1,108	237	5,330	-	598	-	-	-	258	856	6,186	304	855	977	727	466	-	-	329	9,5	-	355	355	9,870
6/2017	2,344	3,476	189	300	6,309	153	520	-	-	-	1,066	1,739	8,048	208	810	358	51	384	57		1,868	9,916	146	53	199	10,115
7/2017	886	1,882	-	363	3,131	-	850	-	307	-	54	1,211	4,342	322	818	227	165	501	-		2,033	6,375	-	328	328	6,703
8/2017	2,225	1,857	-	370	4,452	186	561	388	59	-	214	1,408	5,860	424	579	241	130	-	-		1,374	7,234	-	174	174	7,408
9/2017	2,234	1,856	159	253	4,502	-	534	-	-	-	292	826	5,328	371	812	283	130	-		77	1,673	7,001	-	101	101	7,102
10/2017	2,025	1,950	68	237	4,280	58	433	-	56	-	-	547	4,827	289	1,277	694	244	63		-	2,567	7,394	-	539	539	7,933
11/2017	1,470	1,476	70	294	3,310	-	100	-	68	159	136	463	3,773	118	449	117	80	-		-	764	4,537	-	753	753	5,290
12/2017	812	2,138	239	336	3,525	-	115	91	-	-	57	263	3,788	399	387	371	-	-	60	-	1,317	5,105	-	416	416	5,521
1/2018	1,880	2,073	1,901	145	5,999	58	264	51	-	-	88	461	6,460	549	1,139	281	187		2,496	-	4,872	11,332	-	1,033	1,033	12,365
12-mo (this year)	*1,672*	*2,208*	*369*	*264*	4,512	*58*	*418*	*53*	*47*	*13*	*272*	860	5,372	*327*	*673*	*446*	*197*		*397*	*45*	2,310	7,682	*27*	*354*	381	8,063
	21%	27%	5%	3%	56%	1%	5%	1%	1%	0%	3%	11%	67%	4%	8%	6%	2%	%	5%	1%	29%	95%	0%	4%	5%	100%

SIRS Heat Map: Major Incident Delays per Month stem, 50+ Delays, Weekdays Only **DRAFT**

January 2018

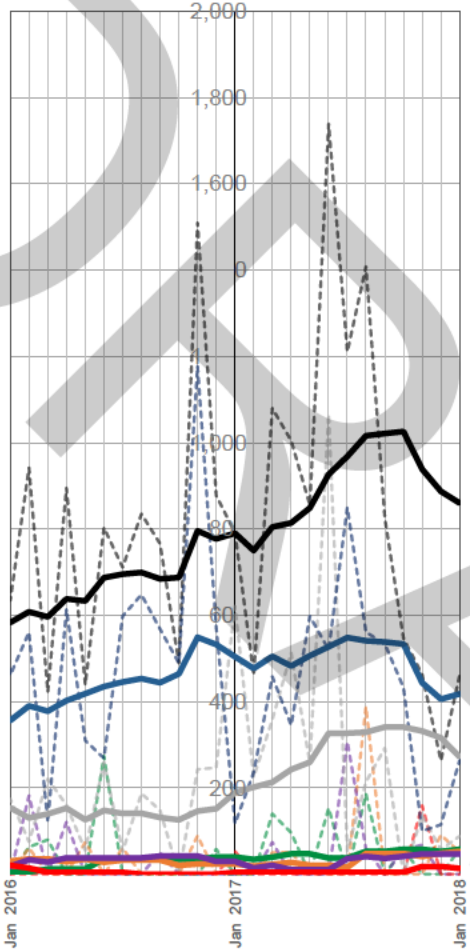
12-Month Rolling

Unplanned ROW Work



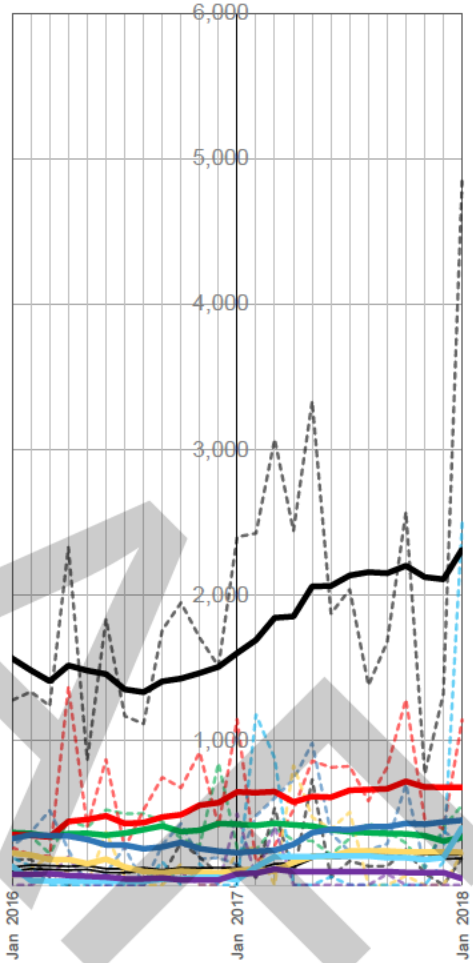
Total Unplanned ROW
Track
Signals
Infrastructure, Electrical, EMD, E&E, MOW Eng.
CPM, MCC

Other In



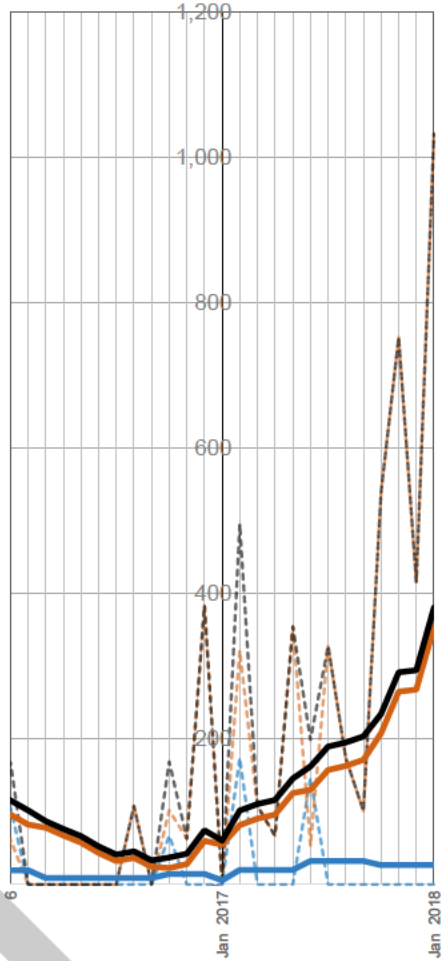
Total Internal
Stations
Car Equipment
Service Delivery
Operations Training (Probationary Crews)
IT, OP, Revenue
Unknown Cause

External



Total External
Sick/Injured Customer
Persons on ROW
Public Conduct, Crime, Police Response
Passenger-Related (Other)
Power Utility
Inclement Weather
Other External

Operating Environment



Total Operating Environment
ficient Capacity, Excess Dwell, Unknown
ROW Work

SIRS Heat Map: Major Incidents per Month, Syste 50+ Delays, Weekdays Only **DRAFT**

January 2018

Sys

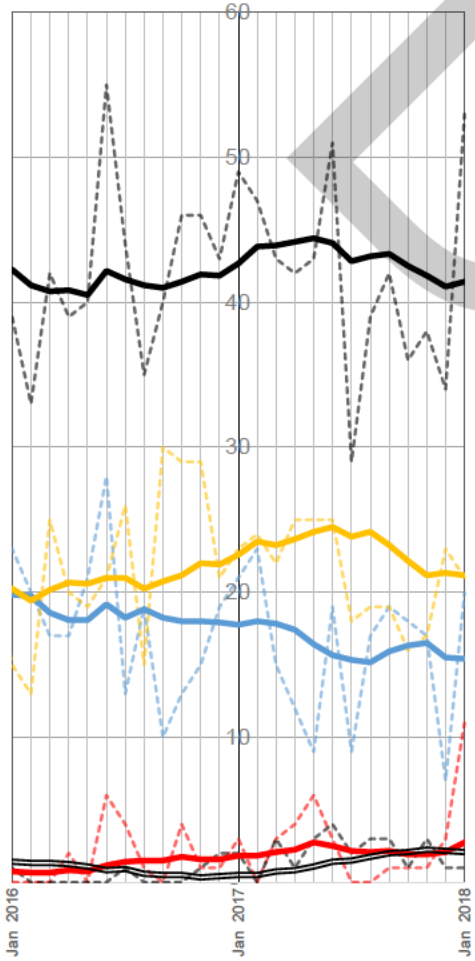
| | Incidents / Temporary Disruptions | | |

SIRS Heat Map: Major Incidents per Month, Syste 50+ Delays, Weekdays Only **DRAFT**

January 2018

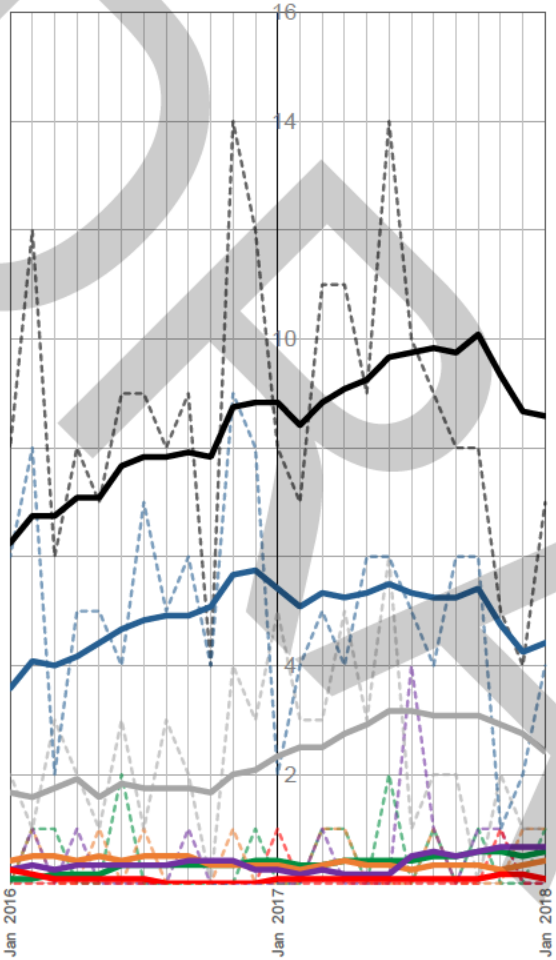
12-Month Rolling

Unplanned ROW Work



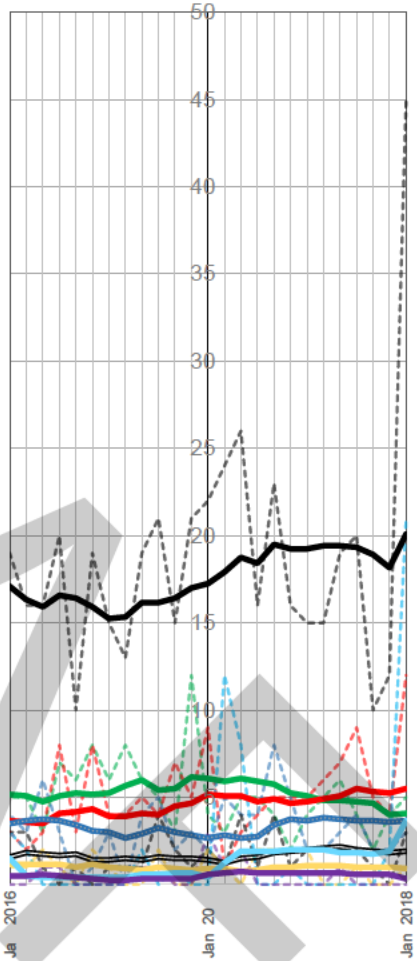
Total Unplanned ROW
Track
Signals
Infrastructure, Electrical, EMD, E&E, MOW Eng.
CPM, MCC

Other In



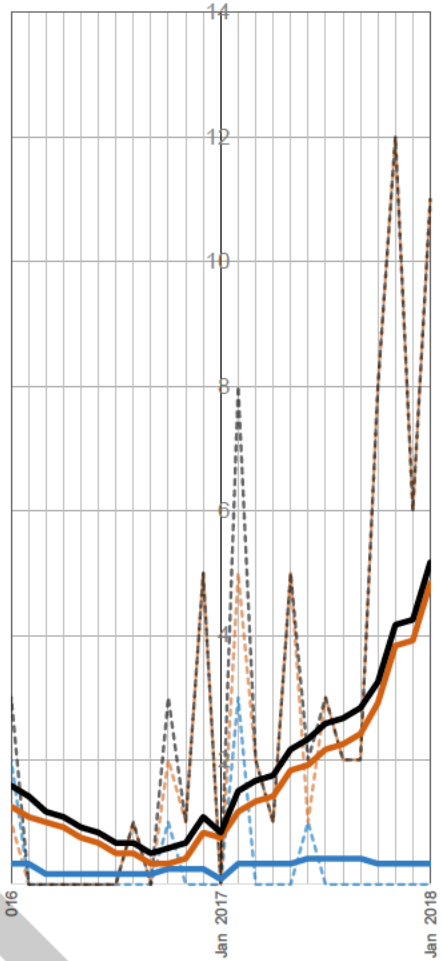
Total Internal
Stations
Car Equipment
Service Delivery
Operations Training (Probationary Crews)
IT, OP, Revenue
Unknown Cause

External



Total External
Sick/Injured Customer
Persons on ROW
Public Conduct, Crime, Police Response
Passenger-Related (Other)
Power Utility
Inclement Weather
Other External

Operating Environment



Total Operating Environment
ficient Capacity, Excess Dwell, Unknown
ROW Work

DRAFT

SIRS Heat Map: Major Incident Delays per Incident by System, 50+ Delays, Weekdays Only — DRAFT

January 2018

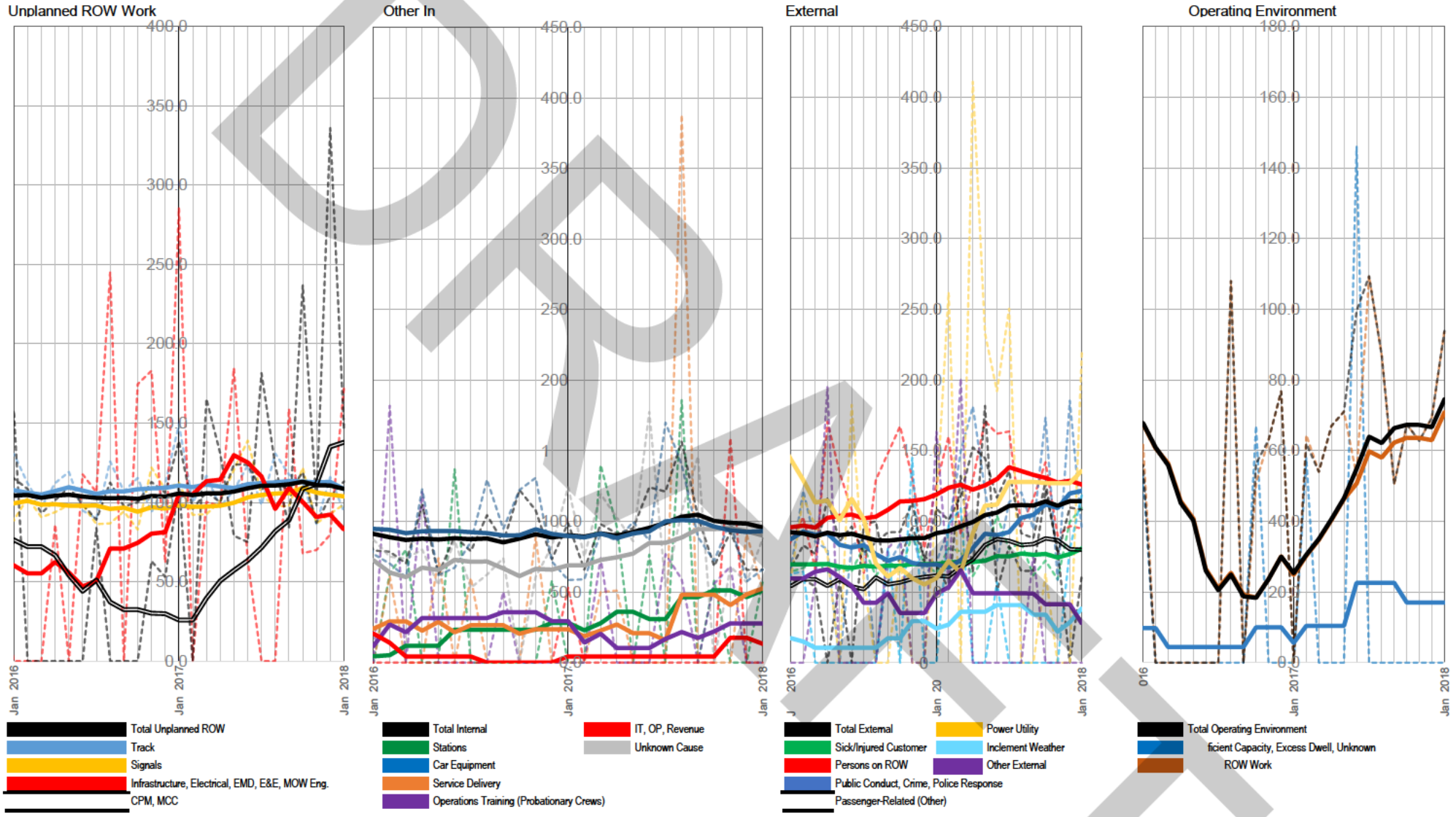
Sys

	Unplanned ROW					Other Internal							Internal	Incidents / Temporary Disruptions: External									Operating Environment			
	Track	Signals	cture, EMD, E&E, MOW	CPM, MCC	Total Unplanned ROW	Stations	Car Equipment	Se	Operations Training (Probationary Crews)	IT, OP, Revenue	Unknown Cause	Total Other Internal	Total Internal	Sick/Injured Customer	Persons on ROW	Public Conduct, Crime, Police Response	Passenger-Related (Other)	Power Utility	Inclement Weather	Other External	Total External	Total Incidents, Disruptions	Insufficient Capacity, Excess Dwell, Unknown	Planned ROW Work	Total Operating Environment	Grand Total
	1	2		4	5	6		8	9		11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Trend																										
This Year vs. Last Year	-3.1	6.1	-18	47.5	3.1	3.7		55.2			31.4	10.8	4.4	11.5	-1.5	38.1	29.3	139.4	20.9	2.9	22.5	9.2	# 13.0	0.3	1.3	7.1
	-3%	6%	-12%	%	3%		2%	78%		200	30%	12%	4%	17%	-1%	46%	40%	120%	24%	2%	24%	9%	10%	0%	2%	7%
This Year vs. Two Years Ago	0.1	4.9	28.4				-4.8	53	2.2	77.0	1	6.8	4.5	10.5	27.7	30.4	33.2	58.3	22.5	-15.0	23.8	9.7	# 21.3	-3.7	0.6	7.9
	0%	5%	27%			%	-5%		-3%	94%		7%	4%	15%	29%	33%	48%	31%	26%	-10%	26%	10%	36%	-5%	1%	8%
January 2018																										
This Month vs. 12 Month	-14.4	-5.6	38.7	18.5	4.3	-40.7	-28	5.2			-24.4	3	0.2	29.6	-27.4	-27.9	-40.2	-27.1	10.7		-6.8	-1.7	#	20.7	20.2	-0.5
	-13%	-5%	20%	15%	4%	-41%		-60%		-	-22%	%	0%	37%	-22%	-23%	-30%	-11%	10%	-	-6%	-2%	-	28%	27%	-1%
This Month vs. Last Month	-22.0	5.8	93.2	-191.0	9.5			-40.0			31.0	0.1	8.0	10.1	-1.8	-91.8			38.9		-1.5	5.8	#	24.6	24.6	8.0
	-19%	6%	117%	-57%	9%		5%	-44%		-	54	0%	8%	10%	-2%	-50%	-	-	40%	-	-1%	6%	-	35%	35%	8%
This Month vs. 12 Months Ago	-55.1	-13.7	-112.8	34.5	-25.5		7.5					-33.0	-25.4	46.3	-31.9	22.7	-7.2	106.0			-0.6	-18.4	#			-19.7
	-37%	-12%	-40%	31%	-18%	-	13%	-				-33%	-19%	73%	-25%	32%	-10%	93%	-	-	-1%	-15%	-	-	-	-10%
Monthly Data																										
1/2015	118.5	93 9	74 0	n/a	105.4	n/a	116.4	53.0		n/a	114 0	107.0	105.6	79.3	87 0	66.7	102 5	245 5	54.3	n/a	89.3	99.9	66.0	76.0	68 5	98.3
2/2015	130.3	84 2	60 0	51 0	104.0	53.0	79.0	n/a		77.0	178 0	107.3	104.4	6	90 3	57 0	n/a	289 0	92.8	n/a	92.5	100.5	n/a	82.5	82 5	100.1
3/2015	111.2	120 2	n/a	n/a	114.3	n/a	88.3	n/a	6	117.0	113 0	93.7	111 9		3	112 0	54 5	287 5	53.0	n/a	101.6	109.0	64.5	52.0	60 3	107.1
4/2015	84.6	90.1	n/a	65 0	86.1	n/a	106.7	78.0		n/a	n/a	99.5		0.7	8 0	71 0	57 0	59 0	n/a	175.0	85.0	86.9	n/a	128.0	128 0	87.6
5/2015	91.3	109 6	80 0	151 5	102.1	n/a	59.5	n/a		n/a	75 2	70		89.0	8 5	95 3	n/a	170 5	n/a	65.0	107.1	99.6	n/a	59.0	59 0	98.3
6/2015	119.2	97 9	223 0	120 3	112.5	n/a	68.0	88.0		n/a	n/a		0.7	75	95.7	106.4	63 3	n/a	n/a	76.0	84.6	100.2	n/a	171.0	171 0	101.3
7/2015	116.1	85 5	64 0	n/a	99.5	n/a	95.0	n/a		n/a	6		98.1	6	97.1	67 8	121 0	231 0	n/a	143.0	105.3	100.1	n/a	66.5	66 5	99.3
8/2015	105.4	112 2	n/a	166 5	115.6	n/a	137.8	n/a	a	52 0		8 3	112.7	6	114 3	76 3	n/a	375 0	n/a	n/a	111.9	112.6	n/a	55.0	55 0	111.6
9/2015	108.8	85 2	n/a	57 0	94.1	n/a	113.7	n/a	n/a		0		98.0		89 3	123 0	116 5	111 0	n/a	n/a	96.0	97.7	n/a	74.0	74 0	96.9
10/2015	98.3	113 3	132 0	n/a	107.9	n/a	121.0	73.0	n/a		65 0		106.0		96 8	56 0	56 5	n/a	n/a	257.0	81.2	98.2	n/a	61.0	61 0	97.1
11/2015	87.9	87 6	113.7	90.7	89.9	n/a	81.0	50.0	n/a	n/a	n/a	70	88.6	5	126 0	138 2	6	87 0	n/a	n/a	104.5	92.0	n/a	n/a		92.0
12/2015	108.2	118.7	51 0	57 0	111.0	n/a	110.3	n/a	75.5	n/a	88 5	100.0	8	0	66 3	79.4		53 0	n/a	n/a	70.2	100.9	n/a	n/a		100.9
1/2016	130.6	88 6	n/a	158 0	115.2	n/a	76.8	n/a	n/a	n/a	87 0	79.4		4.4	86 3	67 0		60 0	63.0	n/a	66.9	96.9	53.0	62.0	56 0	95.1
12-mo (two years ago)	*108.4*	*99.4*	*105.7*	*117.1*	104.3	*53.0*	*99.4*	*72.4*	*72.7*	*82.0*	*92.4*	93.3	10	*69.7*	*94.7*	*91*	*.4*	*8*	*85.6*	*148.5*	91.3	99.9	*58.8*	*76.9*	73.1	99.3
2/2016	112.1	102 9	n/a	n/a	108.5	63.0	70.1	61.0	182.0	n/a	75 0	78.5	100	67.2	103 0	12	59 0		64.5	n/a	83.1	95.9	n/a	n/a		95.9
3/2016	97.1	90.7	n/a	n/a	93.3	80.0	60.5	n/a	n/a	n/a	73.7	70.3	9	72.0	66 0		54 0	9	n/a	57.0	77.0	87.0	n/a	n/a		87.0
4/2016	112.2	93 9	86 0	n/a	101.5	n/a	122.8	n/a	121.0	n/a	80 0	111.9	1	63.7	170 6	3	n/a	77 0	n/a	195.0	116.2	107.1	n/a	n/a		107.1
5/2016	119.2	98 5	n/a	n/a	109.4	n/a	62.0	74.0	n/a	n/a	55 0	62.7		66.2	134	n/a	58 0	n/a	a	n/a	85.9	99.5	n/a	n/a		99.5
6/2016	94.9	98 5	117.7	n/a	98.8	137.0	67.3	n/a	n/a	n/a	86.7	89.2		64.8	1		n/a	182 5		n/a	96.3	97.2	n/a	n/a		97.2
7/2016	89.8	86 3	106 5	84 0	89.2	n/a	85.4	60.0	n/a	n/a	53 0	79.0	4	81.8			98 0	58 0		n/a	77.5	85.3	n/a	n/a		85.3
8/2016	125.9	86 8	245 0	n/a	112.5	n/a	129.6	n/a	n/a	n/a	62 3	104.4	0	61 5	3		00 0	n/a	n/a	n/a	85.3	105.1	n/a	108.0	108 0	105.1
9/2016	107.0	94.4	n/a	n/a	97.5	n/a	94.7	n/a	50.0	n/a	74 0	85.1	5.2	7	48 2	69 0	0	n/a	81.0	8	92.3	94.4	n/a	n/a		94.4
10/2016	115.4	82 9	174 5	n/a	100.0	n/a	122.3	n/a	n/a	n/a	n/a	122.3	101.8		167 3	84.4		73 0	n/a		92.5	99.1	67.0	51.0	56 3	97.3
11/2016	93.8	121 9	183 0	63 0	112.8	n/a	130.9	89.0	n/a	n/a	60 8	107.9	111.7		130.7	90 0		n/a	145.0	n	13.4	112.0	n/a	63.0	63 0	111.4
12/2016	111.7	108 2	62 0	53 0	106.1	58.0	71.6	n/a	n/a	n/a	82 3	73.2	98.9	9.9	80 8	62 3	75	n/a	n/a	n/a	7	91.4	n/a	76.8	76 8	90.5
1/2017	149.1	112.4	285.7	110 5	138.7	n/a	58.5	n/a	n/a	53.0	124 2	98.9	133.1	63.5	126 8	71 0	69 5	114 0	n/a	163.7		126.3	n/a	n/a		126.3
12-mo (last year)	*111.5*	*98.2*	*152.2*	*79.0*	105.8	*95.0*	*93.0*	*71.0*	*117.7*	*53.0*	*81.1*	89.4	103.0	*68.7*	*123.8*	*83.5*	*73.2*	*107.7*	*87.2*	*130.6*	9	100.4	*67.0*	*73.0*	72.4	100.0
2/2017	99.9	92 2	n/a	n/a	96.0	n/a	59.0	n/a	n/a	n/a	75 0	65.9	92.1	81.0	160 0	95 2	52 0	262 0	97.7	55.0	10	94.8	58.0	64.4	62 0	91.7
3/2017	116.8	92 5	100 3	165 3	106.6	140.0	91.6	50.0	74.0	n/a	119 3	98.2	104.9	78.8	90 3	149 5	132 3	n/a	109.1	201.0		2	n/a	54.0	54 0	107.8
4/2017	97.1	100 8	97 5	131 0	100.2	96.0	86.3	51.0	n/a	n/a	102 6	91.4	98.3	61.4	129 8	181 3	64 0	411 0	n/a	n/a	3		n/a	67.0	67 0	110.2
5/2017	107.8	120 6	184.7	79 0	124.0	n/a	99.7	n/a	n/a	n/a	86 0	95.1	119.0	76.0	171 0	122.1	181 8	233 0	n/a		4.7	12	n/a	71.0	71 0	123.4
6/2017	123.4	139 0	63 0	75 0	123.7	76.5	86.7	n/a	n/a	n/a	177.7	124.2	123.8	104.0	162 0	71 6	51 0	192 0	57.0		116.8	122.4	146.0	53.0	99 5	121.9
7/2017	98.4	104 6	n/a	181 5	108.0	n/a	170.0	n/a	76.8	n/a	54 0	121.1	111.3	80.5	163 6	113 5	82 5	250 5	n/a		135.5	118.1	n/a	109.3	109 3	117.6
8/2017	130.9	97.7	n/a	123 3	114.2	186.0	140.3	388.0	59.0	n/a	107 0	156.4	122.1	84.8	96 5	120 5	65 0	n/a	n/	n/a	91.6	114.8	n/a	87.0	87 0	114.0
9/2017	117.6	97.7	159 0	84 3	107.2	n/a	89.0	n/a	n/a	n/a	146 0	103.3	106.6	61.8	116 0	94 3	65 0	n/a		77.0	88.1	101.5	n/a	50.5	50 5	100.0
10/2017	112.5	121 9	68 0	237 0	118.9	58.0	72.2	n/a	56.0	n/a	n/a	68.4	109.7	72.3	141 9	173 5	122 0	63 0		n/a	128.4	115.5	n/a	67.4	67 4	110.2
11/2017	86.5	86 8	70 0	98 0	87.1	n/a	100.0	n/a	68.0	159.0	68 0	92.6	87.7	59.0	89 8	58 5	80 0	n/a	a	n/a	76.4	85.6	n/a	62.8	62 8	81.4
12/2017	116.0	93 0	79.7	336 0	103.7	n/a	57.5	91.0	n/a	n/a	57 0	65.8	99.7	99.8	96 8	185 5	n/a	n	0.0	n/a	109.8	102.1	n/a	69.3	69 3	98.6
1/2018	94.0	98.7	172 8	145 0	113.2	58.0	66.0	51.0	n/a	n/a	88 0	65.9	107.7	109.8	94 9	93.7	62 3	2	118.9	n/a	108.3	107.9	n/a	93.9	93 9	106.6
12-mo (this year)	*108.4*	*104.3*	*134.1*	*126.5*	108.9	*98.7*	*94.6*	*126.2*	*70.5*	*159.0*	*112.4*	100.2	107.4	*80.2*	*122.4*	*121.5*	*102.6*	2	*108.1*	*133.5*	115.0	109.6	*80.0*	*73.3*	73.7	107.1

SIRS Heat Map: Major Incident Delays per Inciden System, 50+ Delays, Weekdays Only **DRAFT**

January 2018

12-Month Rolling



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Appendix II - Variance Analysis

Example Variance Analysis, March 2016 through February 2017 data, included in "TAC Prep" materials prepared in advance of the MTA Transit Committee's April 2017 meeting.

Performance Variance Analysis

DRAFT

Estimated Quantification of Causes of Change in Performance
February 2017
Performance Analysis Unit
Department of Subways

Black = favorable change
Red = unfavorable change

		SIRS, 24 hours				Terminal Database, 24 hours		100% Electronic, 18 hours	
		Incidents Per Weekday	Delays Per Weekday						
		A	B	C	D B+C	E	F	G	
		Temporary Disruptions / Incidents	**Temporary Disruption / Incident Delays**	**Change in Operating Environment Delays**	**Total Delays (SIRS)**	**Total Delays (TAC)**	**OTP**	**WA**	**Notes**
Month Over Month									
Last Month: Jan 2017	1	122	1,197	1,422	2,619	2,879	64.1%	75.5%	**Notes**
	2								
Ridership	3	- 0.0%	-	115	115 4.4%	125 4.3%	-1.6%	-0.8%	Average weekday ridership increased 2.2% (approx. 120,000 pax per weekday), and crowding delays up roughly in proportion to ridership. Feb 2017 ridership lower than Feb 2016, but would have been higher than last year adjusting for weather per OMB.
Inclement Weather	4	(0.7) -0.6%	60	-	60 2.3%	85 3.0%	-1.1%	-0.3%	Snowstorm 2/9/17
Sick and unruly customers, and persons on ROW	5	(5.0) -4.1%	(90)	-	(90) -3.4%	(10) -0.3%	0.1%	0.1%	Mostly due to decline in persons on ROW, which fluctuates a lot from month to month
ROW failures	6	1.2 1.0%	(70)	-	(70) -2.7%	(45) -1.6%	0.6%	0.3%	Incidents increased in February but delays fell, as January had unusually severe/major incidents (highest avg. delays per incident in three years), while February fell closer to normal levels.
Planned ROW Work	7	- 0.0%	-	25	25 1.0%	40 1.4%	-0.5%	-0.2%	January was below average; Feb increased to average levels.
TABD-induced crowding	8	- 0.0%	-	(20)	(20) -0.8%	(25) -0.9%	0.3%	0.2%	Decrease in delays charged to dwell/capacity correlated with TABDs.
	9								
Car Equipment	10	1.8 1.5%	20	-	20 0.8%	5 0.2%	-0.1%	0.0%	Increase in delays and incidents attributed to stuck brakes, no motor power, and loss of TO indication (though Feb was close to 12-month average, Jan was below average)
	11								
Ops Training	12	2.1 1.7%	5	-	5 0.2%	(5) -0.2%	0.1%	0.0%	Increase in BIE Employee incidents
Service Delivery	13	(1.6) -1.3%	(15)	-	(15) -0.6%	(5) -0.2%	0.1%	0.0%	Decline in no TO available and station overrun incidents
	14								
Better SIRS data	15	- 0.0%	-	30	30 1.1%	- 0.0%	0.0%	0.0%	Increase in variance from terminal delays (from 9% to10%)
	16								
Unknown / Other	17	0.5 0.4%	(19)	41	22 0.8%	(33) -1.1%	0.4%	0.8%	
	18								
Total Increase/(Decrease)	19	**(1.7)** -1.4%	**(109)**	**191**	**82** 3.1%	**132** 4.6%	**-1.7%**	**0.1%**	Net effect: OTP down (-1.7%), but WA slightly up (+0.1%).
	20	*(0)*	*-9.1%*	*13.4%*	*3.1%*	*4.6%*	*-2.7%*	*0.1%*	- A Div worsened significantly in Feb (bringing down OTP), but B Div improved slightly (holding up WA). On average, each A division line has 45% more impact system-wide OTP than on WA. System-wide WA is averaged by line, and most improved lines have relatively fewer trips (B, M, R, W). E and F also improved (fewer delays, better WA), but not enough to improve system-wide OTP.
	21								- Feb 9 storm seemed to have disproportionately high delays on B Div (but little WA impact) and very low WA on A Div (but less delay impact). This could be partly (but not completely) explained by several major incidents on A Div on Feb 9, independent of the storm.
This Month: Feb 2017	22	**120**	**1,088**	**1,613**	**2,701**	**3,011**	**62.4%**	**75.6%**	
Year Over Year									
Last Year: Feb 2016, 12 month average	100	107	941	1,074	2,015	2,374	69.4%	78.1%	**Notes**
	101								
Reduction of ROW failures	102	(2.0) -1.9%	(5)	-	(5) -0.2%	(10) -0.4%	0.1%	0.1%	Year over year Track failure improvement held steady in recent months (-2 incidents per weekday, -25 delays per weekday), but other ROW failure delays (not incidents) are beginning to offset it. Delays per incident increased across MOW, which may reflect the headwinds of changes in the operating environment. Largest declines in Track incidents attributed to rail repair/replace, BIE debris on roadbed, and rail condition/slow order; largest declines in Track delays attributed to broken rails and fire/smoke conditions.
	103								
Planned ROW Work	104	- 0.0%	-	65	65 3.2%	70 2.9%	-0.9%	-0.3%	Increase in planned ROW Work delays is slowing
G Line Planned ROW Work	105	- 0.0%	-	(20)	(20) -1.0%	(20) -0.8%	0.3%	0.0%	4 additional minutes of scheduled run time on G line in Dec 2015 significantly reduced planned ROW work delays
	106								
Ridership	107	- 0.0%	-	(25)	(25) -1.2%	(30) -1.3%	0.4%	0.2%	Average weekday ridership decreased 0.6% (approx. 35,000 pax per weekday)
TABD-induced crowding	108	- 0.0%	-	30	30 1.5%	35 1.5%	-0.5%	-0.2%	Increase in delays charged to dwell/capacity correlated with TABDs, which are increasing (+45/weekday)
	109								
Sick and unruly customers, and persons on ROW	110	2.9 2.7%	15	-	15 0.7%	25 1.1%	-0.3%	-0.2%	Increase in persons struck and persons on roadbed
	111								
JZ line issues	112	- 0.0%	-	20	20 1.0%	25 1.1%	-0.3%	-0.1%	Better data due to I-TRAC at gap locations, larger proportion of R-32s, and increasing ridership
	113								
Car Equipment	114	1.5 1.4%	10	-	10 0.5%	10 0.4%	-0.1%	-0.1%	
	115								
Ops Training and SD	116	3.1 2.9%	10	-	10 0.5%	5 0.2%	-0.1%	0.0%	Increase in BIE Employee, no TO available, and station overrun
	117								
Inclement Weather	118	0.1	5	-	5 0.2%	- 0.0%	0.0%	0.0%	
	119								
Better SIRS data	120	- 0.0%	-	70	70 3.5%	- 0.0%	0.0%	0.0%	Reduction in variance from terminal delays (from 15% to 12%)
	121								
Unknown / Other	122	0.4 0.4%	6	142	148 7.3%	162 6.8%	-1.9%	-0.9%	Temporary Disruption/Incident delays are relatively easy to explain via SIRS data, but delays due to changes in the operating environment are not. "Crowding" delays behave consistent with changes in operating environment (signal modifications, flagging rules/practices, more cautious train operation, etc.). E.g., terminal delay database enables us to see intervals repeatedly delayed due to crowding, and we could perhaps use this to exclude such trains from other incidents.
	123								
Total Increase/(Decrease)	124	**6.0** 5.6%	**41**	**282**	**323** 16.0%	**272** 11.5%	**-3.3%**	**-1.5%**	Overall trend slightly worse than last month, both OTP and WA. Year-over-year decline stopped leveling out in November 2016.
	125	*5.6%*	*4.4%*	*26.3%*	*16.0%*	*11.5%*	*-4.8%*	*-1.9%*	
	126								
This Year: Feb 2017, 12 month average	127	**113**	**982**	**1,356**	**2,338**	**2,646**	**66.1%**	**76.6%**	

Appendix III - Example TDD Remarks

Selected illustrative TDD “remarks” included in sample of reported Delays inaccurately attributed to “Overcrowding” in MTA disclosures from 2016-2017.

Illustrative Sample of TDD Remarks for Delays Publicly Attributed to "Overcrowding," 2016-2017 (Excluding Blank Remarks)			
Remarks	**Coded with Reason Code 25 - "Customer Holding Doors"**	**Coded with Reason Code 81 - "Insufficient Capacity"**	**# of Delays Publicly Attributed to "Overcrowding"**
EXCESS DWELL	2,501	2	2,503
Excess Dwell Time (4038)	1,577	1	1,578
LAS	810	118	928
l/a	573	326	899
late arrival	451	412	863
Ins. by S1 EXCESS DWELL	697		697
residual	442	148	590
crossover		544	544
LTL/LA	244	295	539
LTL	251	264	515
Ins. by S400 excess dwell	444		444
Residual Delays	171	271	442
late arr	240	198	438
Plugged by leader	136	251	387
Ins. by S1 Excess Dwell Time (4038)	353		353
excess dwell @ fkn	333		333
LAN	277	44	321
xover		283	283
EXCESS DWELL FKN	273	7	280
no train	144	130	274
cut	1	229	230
1a	107	115	222
Ltl.	102	92	194
EXCESS DWELL 180	192	1	193
BALANCE	139	44	183
LTL L/A	104	76	180
81: Congestion @ 34		176	176
81: Congestion @ 59		173	173
plug by leader	59	114	173
97: Train Swap - No TABD	74	93	167
Ins. by S76	144	20	164
x-over		164	164
EXCESS DWELL ATL	151	1	152
BAL	123	23	146
Plugged by train service.	4	134	138
Plugged by leader.	50	86	136
left term late	66	69	135
la/ltl	66	66	132
Cong in QNs		130	130
ltl la	66	64	130
Short Relay	59	68	127
1 A to Dekalb.	56	66	122
Ins. by S401 EXCESS DWELL	118		118
late arrival s/b	71	46	117
CODE 4041	2	109	111
HVY RIDING	109		109
LEFT TERMINAL LATE / SHORT TIME TO CLEAN OUT & RELAY TRAIN @ BROAD STREET.	5	103	108
Rush hour traffic		108	108
L/A LTL	54	50	104
EXCESS DWELL @ 3RD	101		101
RESIDUALS	37	64	101
Ins. by S400 LAS	95	5	100
LAS @ UTI	83	17	100
Inspection	43	52	95
LTL LA	49	44	93
BAS	58	34	92
Ins. by S60 excess dwell	90		90
to bal	71	16	87
Cut to Chl.		86	86
res/delay	34	51	85
CODE 97	77	5	82

Illustrative Sample of TDD Remarks for Delays Publicly Attributed to "Overcrowding," 2016-2017 (Excluding Blank Remarks)			
Remarks	**Coded with Reason Code 25 - "Customer Holding Doors"**	**Coded with Reason Code 81 - "Insufficient Capacity"**	**# of Delays Publicly Attributed to "Overcrowding"**
1b	49	32	81
EXCESS DWELL 125	81		81
PUSH	29	52	81
boost cong		77	77
conjestion		76	76
cross over		76	76
x over		76	76
Ins. by S59 EXCESS DWELL	75		75
LTL DUE TO L/A	38	37	75
Ins. by S35 EXCESS DWELL	74		74
Ins. by S68	65	9	74
LA	43	31	74
Ins. by S20 excess dwell	73		73
residual delay	26	47	73
congestion	1	71	72
pushed to avoid congestion		72	72
LA-LTL	36	35	71
Excess Dwell Time (4038)-TSQ	70		70
LTL DUE TO LA	30	40	70

Appendix IV - Delay Category Descriptions

Descriptions of reported delay categories prepared by MTA in response to the Comptroller's information requests.

Delayed trains are categorized into a delay category based on dispatcher remarks. Remarks are used to assign a reason code that folds into one of sixteen categories. Categories include:

Non-Incidents – These delays are due to the operating environment rather than specific events that create delays

1. Over Crowding / Insufficient Capacity / Other – delayed trains with dispatcher remarks referring to train congestion, excess dwell times, and/or customers holding doors; these delays are typically related to other factors, which may include long-term changes to the operating environment, in addition to true capacity issues.
2. Planned Trackbed Work – trains delayed by track workers on the right of way (ROW).
3. Unknown – delayed train intervals without dispatcher remarks.

Incidents – Temporary disruptions/blockages, occurs randomly

4. ROW Delays – trains delayed due to failures on the ROW. Examples of ROW failures include switch/signal trouble and broken rails.
5. Work Equipment/G. O. – trains delayed due to general orders (i.e., planned service changes) in place to facilitate construction work on the ROW. This category also encompasses trains delayed to allow for the passing of work trains.
6. Sick Customer – trains delayed due to a sick or injured customer.
7. Car Equipment – trains delayed due to subway car issues. Examples include door problems, no motor power, brake problems, dark car, and a loss of train operator/conductor indication.
8. Operational Diversions – trains delayed due to schedule adjustments made at originating terminals whenever the number of trains available or required for service is higher or lower than the number required by the timetable (i.e. flexes).
9. Police – trains delayed due to police activity relating to conditions such as passengers struck by trains, trespassers, assaults, or suspicious packages.
10. Employee – trains delayed due to employee error or availability. Examples include switch run-throughs, station overruns, improper operation, sick/injured employee, and missing crews.
11. Unruly Customer – Examples include vandalism, civil demonstrations, customers activating the emergency brakes, graffiti/vandalism, train surfers, and general violations of the NYCT Rules of Conduct. This category is closely related to the Police category.
12. Inclement Weather – trains delayed due to severe weather and/or related preparation.
13. Fire – trains delayed by fire/smoke conditions.
14. External – trains delayed by events outside NYCT property, such as building collapses or a drawbridge opening to allow marine traffic.
15. Infrastructure – a form of ROW failure. This category includes trains delayed due to conditions such as closed/dark station, water intrusions, or gap filler failure.
16. Collision/Derailment – trains delayed by a collision or derailment on the mainline or in a yard.

Appendix V – "One Pager"

Example "One Pager," July 2015 through July 2016 data, included in “TAC Prep” materials prepared for MTA executives in advance of the MTA Transit Committee’s September 2016 meeting.

Subway Performance Summary - July, 2016

WA (Weekday)

	Monthly*	12-Mo	A Div/12-Mo	B Div/12-Mo	6 Monthly*	7 Monthly*	F Monthly*
7/2015	77.8%	78.1%	75.2%	79.8%	69.2%	73.8%	72.7%
6/2016	78.6%	78.4%	74.6%	80.5%	66.7%	74.6%	73.3%
7/2016	***78.1%***	***78.5%***	***74.4%***	***80.7%***	***66.2%***	***73.7%***	***70.9%***
Diff (vs. prior year)	0.3%	0.4%	-0.8%	0.9%	-3.0%	-0.1%	-1.8%
Diff (vs. prior month)	-0.5%	0.1%	-0.2%	0.2%	-0.5%	-0.9%	-2.4%
13-Month Trend							

ROW Failure Incdt (Per Weekday)

	Monthly	12-Mo	A Div/12-Mo	B Div/12-Mo	6 Monthly	7 Monthly	F Monthly
7/2015	25.4	24.3	9.7	14.5	1.9	1.0	2.8
6/2016	22.6	22.8	9.6	13.2	1.5	1.2	1.3
7/2016	***22.6***	***22.5***	***9.5***	***13.0***	***2.3***	***1.1***	***1.6***
Change (vs. prior year)	-10.9%	-7.2%	-2.4%	-10.5%	23.4%	15.2%	-42.3%
Change (vs. prior month)	0.0%	-1.3%	-1.0%	-1.5%	53.3%	-8.3%	23.1%
13-Month Trend							

Planned ROW Work Incdt (Per Weekday)

7/2015	45.6	41.9	14.3	27.7	1.9	1.2	4.3
6/2016	48.1	45.1	15.0	30.1	1.5	2.7	4.5
7/2016	***49.1***	***45.4***	***15.2***	***30.2***	***1.6***	***2.8***	***4.8***
Change (vs. prior year)	7.7%	8.3%	6.7%	9.2%	-14.1%	136.9%	12.3%
Change (vs. prior month)	2.1%	0.7%	1.3%	0.3%	6.7%	3.7%	6.7%
13-Month Trend							

Monthly Major Incidents (All 7 Days / 50+ delays)

7/2015	92.0	78.5	37.0	41.5	11.0	3.0	9.0
6/2016	90.0	77.0	37.6	39.4	6.0	3.0	4.0
7/2016	***74.0***	***75.5***	***37.1***	***38.4***	***10.0***	***2.0***	***6.0***
Change (vs. prior year)	-19.6%	-3.8%	0.2%	-7.4%	-9.1%	-33.3%	-33.3%
Change (vs. prior month)	-17.8%	-1.9%	-1.3%	-2.5%	66.7%	-33.3%	50.0%
13-Month Trend							

MDBF

	Monthly	12-Mo	Monthly MDBSF**	A Div/12-Mo	B Div/12-Mo	NewTech/12 Mo	Legacy/12 Mo
7/2015	114,591	141,719	175,298	124,287	157,974	177,620	108,458
6/2016	114,987	120,313	160,093	114,270	125,224	163,934	85,995
7/2016	***106,253***	***119,505***	***146,911***	***115,675***	***122,514***	***165,091***	***84,495***
Change (vs. prior year)	-7.3%	-15.7%	-16.2%	-6.9%	-22.4%	-7.1%	-22.1%
Change (vs. prior month)	-7.6%	-0.7%	-8.2%	1.2%	-2.2%	0.7%	-1.7%
13-Month Trend							

DCE Delay Causes

Period	MDBF	% Door Delays	% Air Brake	% Propulsion	% Other
July	106,253	33%	21%	21%	25%
12-Month	119,505	39%	21%	19%	21%

Etc. (Weekday)

		Term OTP	A Div OTP	B Div OTP	Delays	S-KPI	PES-KPI
Monthly	7/2015	69.4%	65.9%	72.3%	52,216	76 8%	
	7/2016	66.5%	62.2%	70.2%	51,309	74.7%	
	% Diff	-2.9%	-3.7%	-2.1%	-1.7%	-2.1%	
12-Mo	7/2015	71.7%	67.7%	75.1%	46,472	77.4%	91.4%
	7/2016	68.5%	64.2%	72.1%	51,467	75.6%	91.9%
	% Diff	-3.2%	-3.5%	-3.0%	10.7%	-1.8%	0.5%

SIR

	SI OTP	AM OTP	PM OTP	Comp. Trips	SI MDBF	SI PES-KPI
	97.6%	99.2%	99.0%	99 8%	74,376	
	97.3%	100.0%	98.1%	100.0%	111,059	
	-0.3%	0.8%	-0.9%	0.2%	49.3%	
	93.1%	93.3%	94.7%	99.7%	48,560	91.0%
	96.0%	95.6%	98.4%	99.9%	82,140	91.1%
	2.9%	2.3%	3.7%	0.2%	69.2%	0.1%

Wait Assessment

Major causes of system-wide 12 mo. WA trend (+0.4%):
- Reduction of ROW failures (+0.2%)
- 6 Line schedule revisions (+0.1%)
- Offset, however, by increased ridership (-0.2%) and planned ROW work (-0.2%)
- Improvement in WA is due to B-Division and not statistically significant (B Division improvement needs to exceed 2.0% for there to be a 95% chance that the improvement is real)

6 Line S-35 Supplement Schedule

The "S-35" supplement, which took effect on Monday, March 7th, addresses the changed circumstances of the 6 line (signal modifications and a fleet with narrower doors) by lengthening *scheduled* running times during the morning and evening rush hours in both directions and by reducing *scheduled* throughput in the morning rush hour from 24 to 22 trains per hour. The *actual* running times and throughput, however, changed little. This enabled more reliable operations and led to improved WA and OTP in March, April, and May. OP recommended making these schedule changes permanent in the Spring 2017 pick, pending management approval.

However, the supplement was temporarily suspended from June 12th to July 27th, reducing 6 Line WA and OTP in June and July. This partly explains increase in delays charged to crowding in June (despite declining ridership), since more than 50% of the crowding delay increase was on the 6 line.

S-KPI

- S-KPI - J/Z decline due to trading R-160s for R-32s with the C line (MDBF), installation of I-TRAC at gap locations (OTP), and ridership growth (OTP and WA).

Car Equipment - Hot Cars

In July 2016, the metropolitan area experienced 14 days over 90 degrees. This was one of the hottest Julys on record. We also experienced three separate heat waves, one of which lasted seven days.
NYCT provides 5,280 subway cars each weekday for passenger service. The number of hot cars reported on any particular day during the heat wave was less than 1% of the total number of cars in service.

Any report of a hot car is returned to a maintenance shop for inspection and repairs. This is done at the most advantageous time not disrupt our customers. The R62A's on the 1 and 6 Line are ongoing the SMS cycle in 2016-2019. These cars are designed with only one AC unit per car. During the SMS cycle the major air-conditioning components are being replaced or rebuilt.

The Division of Car Equipment performs the following tasks on a regular basis:
- Replace AC Filters every 30-35 days
- Clean condensers and evaporators
- Perform a pre-service inspections of AC System
- Perform daily surveys of cars in service to identify potential hot cars.

E&E

- Escalator and elevator availability improved over last quarter. AM and PM peak availabiliy for both elevators and esclators are now at or above their targets. 24 hour availability, however, is below target due to difficulty filling vacancies. E&E has been short by over 30 maintainers over the past year. Availability numbers for 63rd St escalators are low because of efforts to refurbish critical components ahead of the opening of the 2nd Av Subway.

PES Stations-KPI

- The Bronx has the lowest station PES of any borough due to low scores in the litter and cleanliness appearance subcategories. t's partly due to lack of cleaner availability. In response, cleaning schedules have been adjusted to increase cleaning in the Bronx.

Staten Island Railway

- R-44s began SMS in the first quarter of 2016.

NOTES

- Zeros and blank values = data pending
- Technical corrections were recently made to certain historical A-Division WA data, and therefore certain prior year information reported in the current TAC book may not match the figures reported originally.

9/13/2016, 11:48 AM

Appendix VI - Policy Concerning TDD "Unknown" Cause Delays

February 2009 email directing allocation of TDD “Unknown” cause delays to reported delay categories published in MTA Monthly Operations Reports.

[redacted]

From: [redacted]
Sent: Friday, February 20, 2009 3:52 PM
To: [redacted]
Subject: FW: allocating unreported delays
Attachments: 20090220151739791.pdf

From: [redacted]
Sent: Friday, February 20, 2009 3:27 PM
To: [redacted]
Cc: [redacted]
Subject: allocating unreported delays

[redacted] has asked that you please allocate the unreported delays to the various delay categories based on the percent of the total reported delays the various categories represent. Attached is a little table he prepared showing what he means. Basically, assume there are 10,000 delays, 1,000 (10%) of which are signal-related delays. Now assume there are 1,000 unreported delays. If you were to allocate these 1000 unreported delays to the known delay categories, signals would get 10% of them, or 100. So, in the end, signals will be shown to have 1,100 delays—1000 we know belong there, and another 100 we have allocated proportionally from the unreported pool. Take a look at the attached. It is certain to make more sense than I just did.

[redacted]
Assistant to the President
MTA New York City Transit
2 Broadway
New York, NY 10004
[redacted]

	Raw	Prorated
① Track Gangs	2,000	2,200
② Signals	1,000	1,100
③ Customers	3,000	3,300
④ Congestion	4,000	4,400
⑤ Unreported	1,000	0

Sum of ①, ②, ③, & ④ is 10,000

Percentage Track Gangs = 20%

Signals = 10%

Customers = 30%

Congestion = 40%

Proration Track Gangs = .20(1,000) = 200

Signals = .10(1,000) = 100

Customers = .3(1,000) = 300

Congestion = .4(1,000) = 400

1,000

Appendix VII - Internal "Major Incidents" List

Example internal list of "Subway Weekday Major Incidents" including both "MOR Major Incidents" and "Train Delay Letters with 50+ Delays Not Defined as Major Incidents," November 2018 data, included in “TAC Prep” materials prepared in advance of the MTA Transit Committee’s January 2018 meeting.

Monthly Operations Report Supplement
Subway Weekday Major Incidents

	MOR Major Incident Category	Trouble Description	Department	Date	Day	Time	Station	Line	Trains Delayed	TABDs	Initial Delay
1	Track	TRACK CIRCUIT FAILURE	Track	Nov 10	Fri	15:32	Carroll St	G	158	34	2
2		BROKEN RAIL	Track	Nov 07	Tue	19:26	59 St (IRT Lex. Av)	4	155	37	5
3		RAIL CONDITION-SLOW ORDER	Track	Nov 06	Mon	7:06	Nevins St	3	123	26	38
4		TRACK CIRCUIT F RE	Track	Nov 01	Wed	11:12	Dekalb Av (Flatbush)	N	118	34	92
5		SIGNAL TROUB	Track	Nov 03	Fri	18:44	Grand Central (Upper Level)	5	104	30	5
6		TRACK CIRC L	Track	Nov 16	Thu	17:52	Dekalb Av (Flatbush)	N	100	15	15
7		SWITCH E	Track	Nov 07	Tue	16:08	Queens Plaza	M	91	16	10
8		FIRE/S CONDITIONS	Track	Nov 21	Tue	8:56	Grand Av / Newtown	R	83	15	5
9		FIRE E CONDITIONS	Track	Nov 03	Fri	17:25	Grand Central (Upper Level)	6	73	7	5
10		S TROUBLE	Track	Nov 16	Thu	2:51	W 4 St (IND Wash Sq)	F	71	17	3
11		CONDITION-SLOW ORDER	Track	Nov 01	Wed	11:06	5 Av / 59 St	R	71	14	8
12		RE/SMOKE CONDITIONS	Track	Nov 10	Fri	16:55	125 St (IRT Lexington Av)	6	63	14	5
13		BIE-DEBRIS ON ROADBED	Track	Nov 14	Tue	9:53	86 St (IRT Lexington Av)	4	54	3	3
14		SMOKE ISSUING	Track	Nov 27	Mon	18:45	34 St-Herald Sq (IND)	B	53	7	10
15		BIE-DEBRIS ON ROADBED	Track	Nov 16	Thu	8:37	66 St-Lincoln Center	1	52	8	22
16		TRACK CIRCUIT FAILURE	Track	Nov 21	Tue	16:34	36 Av	N	51	2	12
17		FIRE/SMOKE CONDITIONS	Tr	Nov 13	Mon	14:53	72 St (IRT Broadway)	3	50	0	3
18	Signals	CH TROUBLE	ls	Nov 08	Wed	12:22	149 St-Grand Concourse	5	179	54	23
19		T RCUIT	gnals	Nov 09	Thu	10:10	Flatbush Av Brooklyn College	2	141	52	29
20		SIGN	Signals	Nov 22	Wed	8:35	36 St (Northern Blvd)	E	137	36	3
21		SIGNAL TROUBLE	Signals	Nov 14	Tue	17:03	Vernon Blvd-Jackson Av	7	120	21	5
22		BIE-AUTOMATIC SIGNAL	Signals	Nov 22	Wed	11:50	125 St (IRT Lexington Av)	5	106	8	3
23		SIGNAL TROUBLE	nals	Nov 20	Mon	4:27	Nevins St	4	96	9	5
24		BIE-AUTOMATIC SIGNAL	ls	Nov 24	Fri	17:05	Hoyt St-Fulton Mall	3	87	2	3
25		TRACK CIRCUIT FAILURE	S	Nov 10	Fri	18:00	Prospect Av (BMT Bklyn)	D	82	7	9
26		SYSTEM MAINTENANC MENT	Sig	Nov 09	Thu	11:43	36 St (4 Av)	D	76	21	11
27		SIGNAL TROUBLE	Sig	Nov 02	Thu	19:58	Williamsburgh Bridge	M	61	20	10
28		TRACK CIRCUIT FAILURE	Sig	Nov 06	Mon	16:36	City Hall	N	60	11	13
29		TRACK CIRCUIT FAILURE	Si	Nov 07	Tue	15:28	Queensboro Plaza	N	59	19	30
30		GAP FILLER FAILURE	S	Nov 08	Wed	22 09	14-Union Sq. (IRT 4 Av)	5	58	17	9
31		SIGNAL TROUBLE	S	Nov 07	Tu		Queensboro Plaza	N	58	14	20
32		SWITCH TROUBLE	s	Nov 1		16	Broadway-Lafayette St	M	53	17	5
33		TRACK CIRCUIT FAILURE	s		on		Buhre Av	6	52	9	3
34		SIGNAL TROUBLE	s	06	Mon	5	36 St (Northern Blvd)	F	51	4	0
35	Persons on	*BIE-PERSON STRUCK/ALIVE	Po ce	Nov 17	Fri	:27	Bleecker St	6	135	29	3
36	ROW/Police/	PERSON ON ROADBED	Police	Nov 22	We	7:48	President St	2	121	28	27
37	Medical	BIE-DEBRIS ON ROADBED	Public	v 07	T	15:29	96 St (Broadway)	3	80	33	8
38		PERSON ON ROADBED	Police	6		17:10	110 St (IRT Lex Av)	6	72	15	11
39		PERSON ON ROADBED	Police	N		18:18	Bergen St (IR v)	3	66	17	20
40		ASSISTANCE REFUSED/UNFOUNDED	Public	Nov		16:06	Queensbo	7	65	20	5
41		BIE-EBV-CUSTOMER	Public	Nov 0	ed	7:51	Jay St-M ch (IND)	A	62	16	21
42		#CUSTOMER ASSAULTED/ROBBED	Police	Nov	hu	8:14	51 St	6	55	17	11
43		*BIE-PERSON STRUCK/ALIVE	Police	No	Mon	5:08	Su vd	F	55	20	18
44		SICK CUSTOMER	Public	N	Thu	8:42		5	53	4	17
45	Stations &	SIGNAL TROUBLE	CPM	N 3	Mon		ernon B kson Av	7	127	64	5
46	Structure	BIE-AUTOMATIC SIGNAL	CPM	Nov 20	Mon		Queensboro	N	92	31	38
47		DEBRIS ON ROADBED	CPM	Nov 27	M	:50	72 St (IRT Bro	2	75	2	8
48		LATE CLEAR OF GENERAL ORDER	Infrastructures	Nov 01		15:00	33 St (Queens Bl	7	70	15	37
49	Subway Car	UNUSUAL NOISE-RIGHT OF WAY	Car Equipment	Nov 13	Mon	15:25	Norwood Av	J	1	28	90
50	Other	AUTOMATIC TRAIN SUPV	Technology/Info.	Nov 03	Fri	10:05	Parkchester	6			9
51		BIE-UNDER INVESTIGATION	Miscellaneous	Nov 28	Tue	8:09	5 Av-Bryant Park	7	2		15
52		BIE-UNDER INVESTIGATION	Operations Training	Nov 20	Mon	9:18	Bowling Green	4	68	1	14
53		BIE-UNDER INVESTIGATION	Miscellaneous	Nov 02	Thu	15:39	Harlem River Tube	2	64	14	51
									4537	1021	
								ge	86	19	16

Train Delay Letters with 50+ Delays Not Defined as Major Incidents

	Trouble Description	Department	Date	Day	Time	Station	Line	Trains Delayed	TABDs	Initial Delay
1	GENERAL ORDER OPERATION	Operations Planning	Nov 07	Tue	21:00	Dekalb Av (Flatbush)	N	95	17	5
2	GENERAL ORDER OPERATION	Operations Planning	Nov 13	Mon	19:55	36 St (4 Av)	R	84	23	5
3	GENERAL ORDER OPERATION	Operations Planning	Nov 16	Thu	21:11	Whitehall St-South Ferry	N	80	0	10
4	GENERAL ORDER OPERATION	Operations Planning	Nov 21	Tue	20:06	Astoria-Ditmars Blvd	N	69	17	10
5	SUPPLEMENT SCHEDULE	Operations Planning	Nov 17	Fri	21:48	14-Union Sq. (IRT 4 Av)	4	56	2	5
6	SUPPLEMENT SCHEDULE	Operations Planning	Nov 15	Wed	11:13	36 St (4 Av)	D	56	17	2
7	DELAYED BY TRACK/WORK GANGS	Signals	Nov 20	Mon	11:20	3 Av-138 St	6	53	4	3
8	GENERAL ORDER OPERATION	Operations Planning	Nov 09	Thu	21:20	Atlantic Av (Flatbush Av)	Q	53	8	7
9	DELAYED BY WORK TRAIN	Electronics Maintenance Div.	Nov 08	Wed	9:56	125 St (IRT Lexington Av)	2	53	3	3
10	GENERAL ORDER OPERATION	Operations Planning	Nov 22	Wed	20:30	Coney Island-Stillwell Av	N	52	16	7
11	DELAYED BY TRACK/WORK GANGS	Signals	Nov 20	Mon	10:10	Franklin Av (IRT)	5	51	0	3
12	DELAYED BY TRACK/WORK GANGS	Track	Nov 15	Wed	10:51	Myrtle Av (Broadway)	J	51	2	4
							Total	753	109	
							Average	63	9	5

DRAFT

Appendix VIII - Presentation on Revised Delay Categories

Slides presented at the MTA Transit Committee's June 2018 meeting to explain revised delay categories.

Update on delay causation reporting

Objective

- Improve delay causation attribution
- Provide clear information on the nature and magnitude of train delays to inform management strategies for more reliable service

Today's update:

- Preliminary version of revised monthly delay chart

Preliminary Chart: Monthly Weekday Delays
May 2018 (24 hours)

DRAFT

Delay Categories	Trains Delayed	Delayed Trains Per Day (22)	% of Delayed Trains
Track Failures and Emergency Remediation	3,113	142	5.1%
Rail and Roadbed	2,387	109	3.9%
Fire, Smoke, Debris	726	33	1.2%
Signal Failures and Emergency Remediation	6,036	274	9.9%
Subway Car	1,539	70	2.5%
Door-Related	382	17	0.6%
Propulsion	179	8	0.3%
Braking	436	20	0.7%
Other	542	25	0.9%
Other Unplanned Disruptions (e.g. station defect)	1,142	52	1.9%
Train Brake Activation - cause unknown	596	27	1.0%
Service Delivery (e.g., crew performance)	1,363	62	2.2%
External	7,909	360	13.0%
Public Conduct, Crime, Police Response	3,066	139	5.1%
Sick/Injured Customer	2,288	104	3.8%
Persons on Roadbed (including persons struck by train)	690	31	1.1%
External Debris on Roadbed (e.g., trees, shopping cart)	69	3	0.1%
Other Passenger-Related (e.g., retrieval of property from track)	939	43	1.5%
Public Event (e.g., civil demonstration, parade)	404	18	0.7%
Inclement Weather	393	18	0.6%
Other External Disruptions	60	3	0.1%
Operating Environment*	23,576	1,072	38.9%
Planned Right-of-Way Work	15,407	700	25.4%
Total Trains Delayed	**60,681**	**2,758**	**100%**

Former Chart: "ROW Delays"

Former Chart: "Employees"

Former Chart: "Overcrowding/ Insufficient Capacity"

Under Review

Work in progress. Data based on new electronic feeds. Root cause analysis and staff re-training ongoing.

Appendix IX: Internal Draft Revised Delay Categories

"Preliminary Format" of revised delay categories, included in "TAC Prep" pre-meeting briefing materials prepared for MTA executives in advance of the MTA Transit Committee's June 2018 meeting.

PRELIMINARY FORMAT

Subway Trains Delayed

Revised Categories	Example(s) of Former Categories
Track Failures and Emergency Remediation Rail and Roadbed Fire, Smoke, Debris Other (e.g., track-related power, communications, obstructions)	ROW Delays, Infrastructure
Signal Failures and Emergency Remediation CBTC/ATS Signals (Capital Work) Other (e.g., non-capital signal failures, signal obstructions)	ROW Delays
Subway Car (detail below) Door-Related Propulsion Braking Other	Car Equipment
Infrastructure (Stations, Elevators and Escalators, etc.)	Infrastructure
Capital Work (Unplanned Disruptions)	ROW Delays, Infrastructure
Service Delivery (e.g., crew misalignment)	Employee
Other Support Unit (e.g., IT-related signal issues)	Employee, Infrastructure
Brakes in Emergency/Cause Unclear	ROW Delays, Infrastructure, Collision/Derailment
External (detail below) Public Conduct, Crime, Police Response Sick/Injured Customer Persons on Roadbed (including persons struck by train) External Debris on Roadbed (e.g., trees, litter) Other Passenger-Related (e.g., lost property) Other Event (e.g., civil demonstration, parade) Inclement Weather Public Utility (e.g., ConEd, NYPA)	External, Unruly Customer, Sick Customer, Police, Infrastructure, Inclement Weather, Fire
Operating Environment Non-Incidents (e.g. schedule misalignment, insufficient capacity, operator variability)	Overcrowding / Insufficient Capacity / Other, Operational Diversions
Planned Right-of-Way Work Non-Incidents (detail below) Subways Maintenance Capital Work Work Equipment (e.g., work train) Insufficient Supplement Schedule Other (Safety Protection Rules)	Planned Trackbed Work, Work Equipment/G.O.

Note: New categories are determined by responsible departments and trouble descriptions. Categories on the right are where delayed trains in new categories would have typically appeared. Root cause analysis and improved categorization of delays is ongoing.

SIGILLUM CIVITATIS NOVI EBORACI
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