

2022 OPERATIONS PERFORMANCE



Freeway Operations and Special Facilities Performance



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Introduction Letter

Calendar year 2022 experienced increases in traffic volumes which contributed to increases in the number of incidents and amount of delay. Calendar year 2022 also experienced the implementation and development of Transportation Systems Management & Operations (TSMO) strategies to improve the performance of Virginia's transportation network.

Some notable accomplishments include:

- Continued use and development of the Towing and Recover Incentive Program to clear interstate commercial vehicle crashes faster.
- Started the I-95 Variable Speed Limit system in June 2022 to reduce collisions and improvement throughput. Preliminary data shows a reduction in the number of traffic collisions.
- Boring for the Hampton Roads Bridge Tunnel Expansion Project will begin in April 2023 and take approximately a year to complete.
- Opened new I-66 Express Lanes in November 2022 to improve mobility. Continued construction of the I-95 Express Lanes for a 2023 project completion.
- In December 2022, VDOT releases a statewide Resiliency Plan to incorporate resiliency strategies into operations.

In 2022, VDOT also completed a project to standardize the Advanced Traffic Management System. At all 5 Transportation Operations Centers, there is now a common platform to collect traffic information and manage traffic systems. In VDOT's Hampton Roads District, additional traffic information became available with the new system. For this reason, the number of incidents and the clearance times are different from 2021 when the old system operated.

In 2023, we will continue to implement and evaluate the TSMO strategies along several corridors to provide a safer and more reliable transportation system.

Statewide

Summary Interstate Highway Performance for 2022

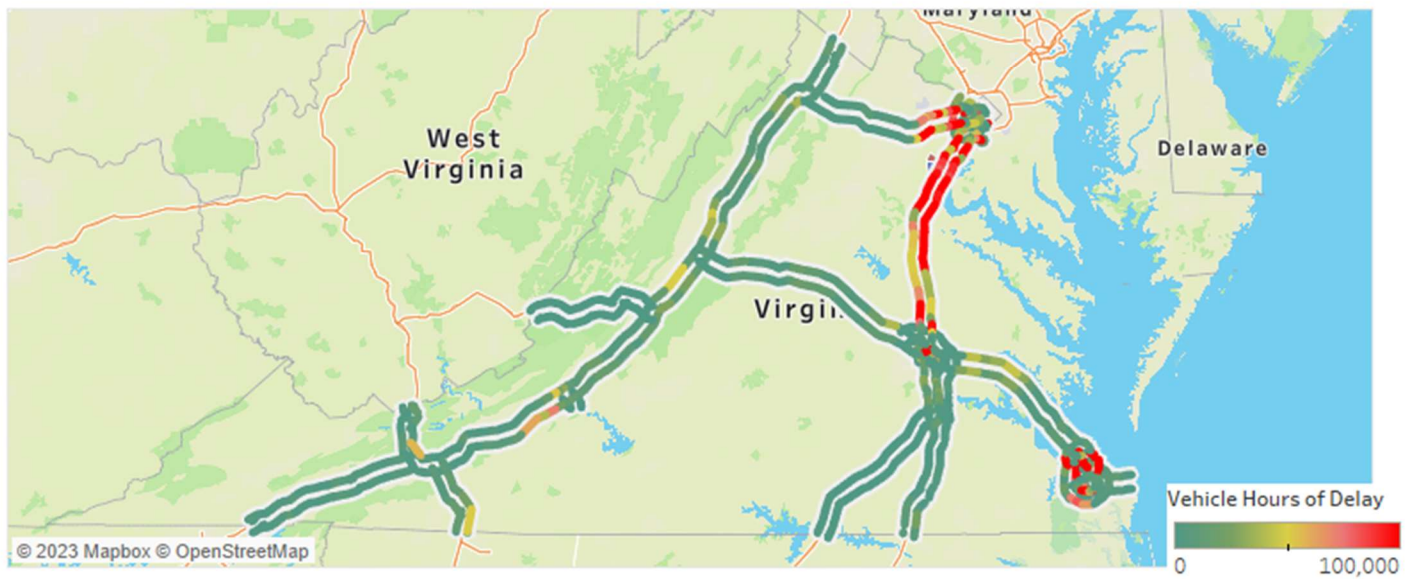
Measure	Bristol							Salem							Richmond							Hampton Roads							Frederick..							Culpeper							Staunton							Northern Virginia							Lynchburg																																																																																			
	Vehicle Hours of Delay on Interstates														All Reported Incidents														All Reported Incidents														Scene Clearance Time (minutes)														Potential Secondary Crash Incidents														Lane Impacting Incidents														Lane Impacting Incidents														Roadway Clearance Time (minutes)														Lane Impacting Incidents Cleared in < 30 minutes														Lane Impacting Incidents Cleared in < 90 minutes													
	Interstate							All Roads							Interstate							All Roads							Interstate							All Roads							Interstate							All Roads							Interstate							All Roads							Interstate							All Roads							Interstate							All Roads																																																
	293K	708K	1,869K	4,087K	3,148K	188K	890K	7,472K	3,650	7,430	25,048	32,304	8,275	3,894	10,308	28,722	1,344	2,744	5,527	21,196	30,799	6,442	2,978	8,997	26,360	19	20	21	15	30	11	13	35	5,502	11,999	41,630	44,368	13,211	6,233	19,582	50,887	11	687	1,580	4,732	8,597	1,670	1,182	2,199	6,031	472	461	861	3,501	7,630	765	381	1,147	4,923	42	50	42	22	45	40	45	34	38%	32%	39%	58%	35%	37%	34%	46%	86%	82%	86%	93%	85%	87%	84%	92%	target: 81%	target: 81%	target: 86%	target: 94%	target: 86%	target: 87%	target: 81%	target: 90%	No Interstates in Lynchburg																																																

Statewide Summary

This report compares performance of Interstate Highways from 2021 to 2022

Measure		Target	2021	2022
Total Vehicle Hours of Delay on Interstates The additional hours travelers waited in traffic that is moving 20 mph less than free-flow speed		↘	15,787K	18,654K
ALL INCIDENTS	Roads All All Reported Incidents Number of disabled vehicle and crash incidents	N/A	105,470	120,975
	Interstates All Reported Incidents Number of disabled vehicle and crash incidents	N/A	88,080	105,047
	Interstates Scene Clearance Time Median time from verifying the incident to opening all lanes and shoulders	↘	22	21
	Interstates Potential Secondary Crash Incidents Estimated # of crash incidents which could be secondary to other incidents	↘	88,148	105,275
LANE IMPACTING INCIDENTS	Roads All Lane Impacting Incidents # of disabled vehicle and crash incidents that block at least one travel lane	N/A	28,395	27,013
	Interstates Lane Impacting Incidents # of disabled vehicle and crash incidents that block at least one travel lane	N/A	20,124	19,575
	Interstates Roadway Clearance Time Median time from verifying the incident to opening all travel lanes to traffic	↘	34	33
	Interstates Lane Impacting Incidents Cleared in < 30 minutes Percentage of Lane Impacting Incidents that are cleared in less than 30 min	N/A	47%	47%
	Interstates Lane Impacting Incidents Cleared in < 90 minutes Percentage of Lane Impacting Incidents that are cleared in less than 90 min	N/A	89%	90%

Congestion in 2022

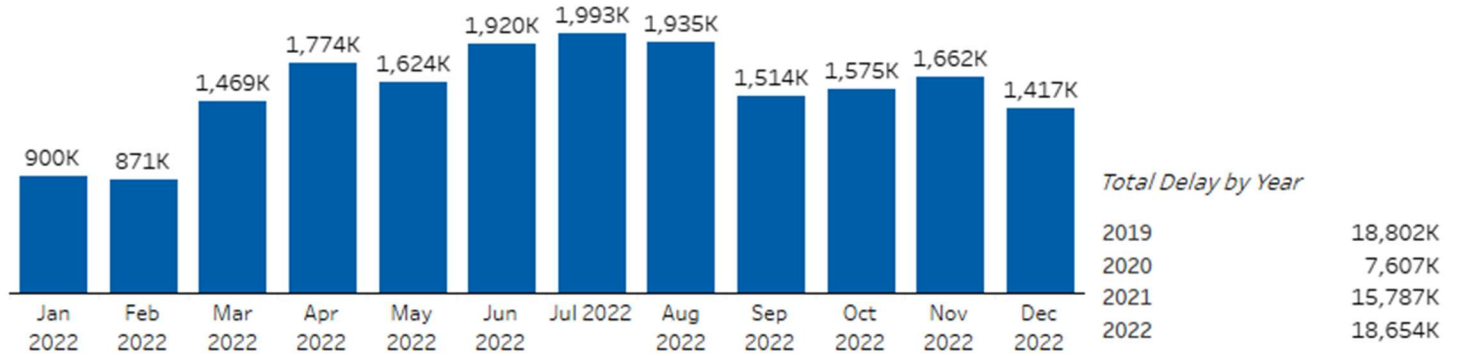




Congestion Overview

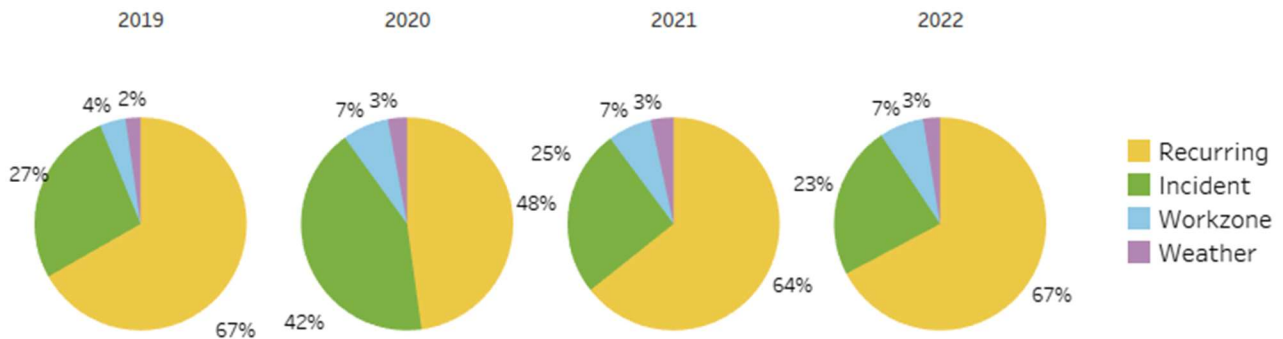
Vehicle Hours of Delay

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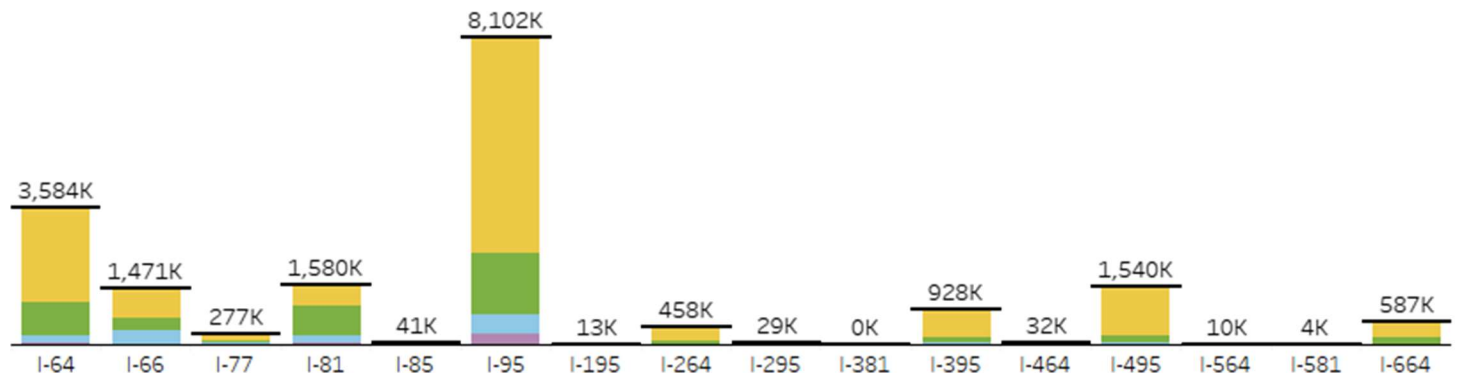


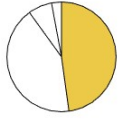
Causes of Congestion

Congestion can be broken down into recurring and non-recurring sources. Recurring congestion is caused by bottlenecks due to high volume or geometric constraints. Sources of non-recurring congestion on interstates include incidents, work zones, and weather events. The amount of congestion due to each of these sources can be estimated at a planning level as shown below.



Delay by Cause & Interstate in 2022





Recurring Congestion

Recurring Congestion occurs when there are capacity issues most often during peak travel hours. Recurring congestion is difficult to manage. However, VDOT can adjust roadway capacity by using managed lanes like HOV or hard shoulders. VDOT measures managed lane performance to adjust these programs.

Managed Lanes

Summary as of December 31, 2022. Facilities > 3 miles considered.

Facility Type	Facilities	Centerline Miles (2022)
High Occupancy Vehicle Lanes	I-66 Exit 40 to Exit 64	22
	I-264 Exit 10 to Exit 18	8
	I-64 Exit 255 to Exit 264	10
	I-64 Exit 285 to Exit 290	6
	VA 267 Dulles Toll Road	10
High Occupancy Toll Lanes	I-495 Express Lanes	14
	I-95 Reversible Express Lanes	29
	I-395 Reversible Express Lanes	9
	I-64 Reversible Express Lanes	7.5
	I-66 Inside the Beltway	10
Part Time/Dynamic Hard-Shoulder Usage	I-66	6.5
	I-264	3.5



Incidents

Traffic incidents includes both crashes and disabled vehicles and are a frequent cause of non-recurring congestion. Quick clearance programs such as Safety Service Patrols, incident management coordination, and after-action review with the Virginia State Police (VSP) and the other first responders can influence the effects of incidents on traffic.

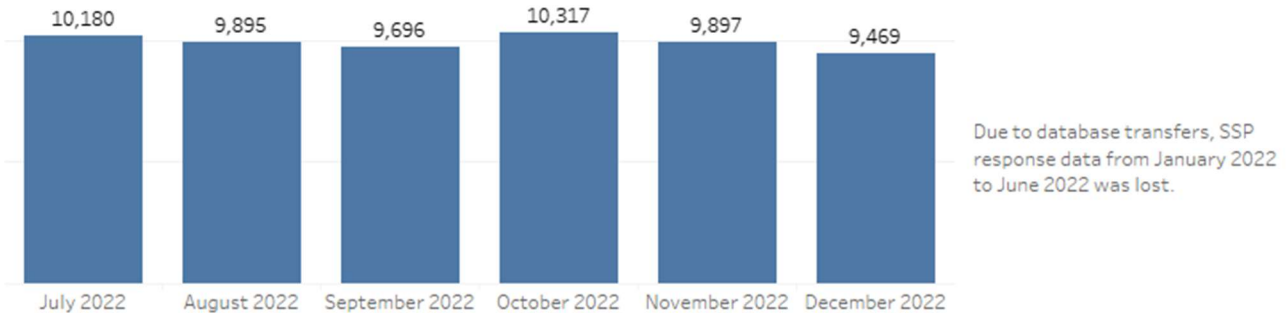
Total Incidents & Incident Clearance Time

Incident Clearance Time (also called Scene Clearance Time) is measured for all crash and disabled vehicle incidents on travel lanes and shoulders. Median Incident Clearance Time is shorter than Median Roadway Clearance Time because it is measured for all incidents, not just those which are lane impacting. A simple incident on a shoulder, such as a vehicle with a flat tire, is often quick to clear. Some Data in October 2022 was permanently lost.

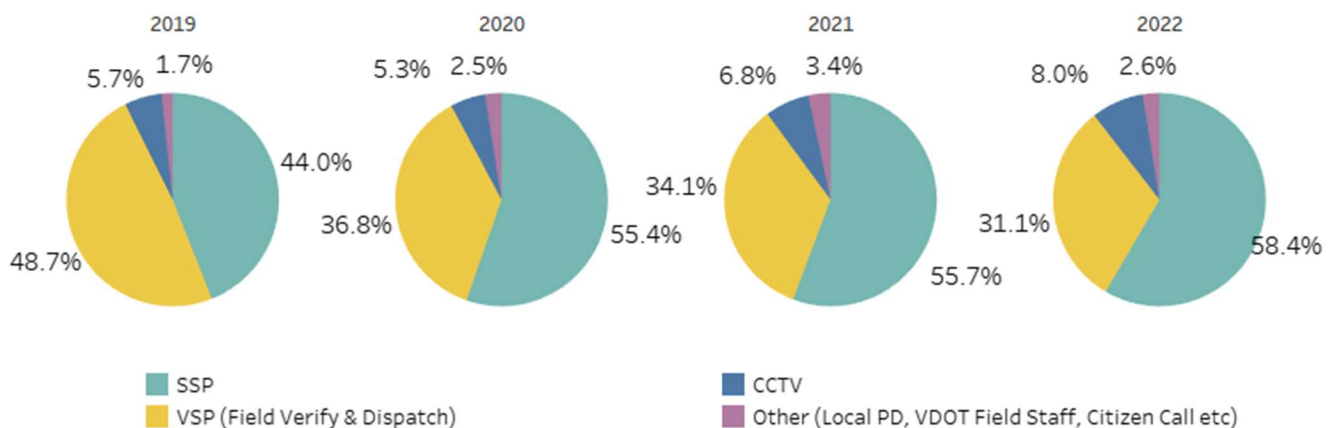


Safety Service Patrol Incident Responses & Response Time

Safety Service Patrol (SSP) Response Time is measured in minutes from the time the SSP Operator was notified to the time they arrived on scene. This is measured for all disabled vehicle and crash incidents, which an SSP responded to.



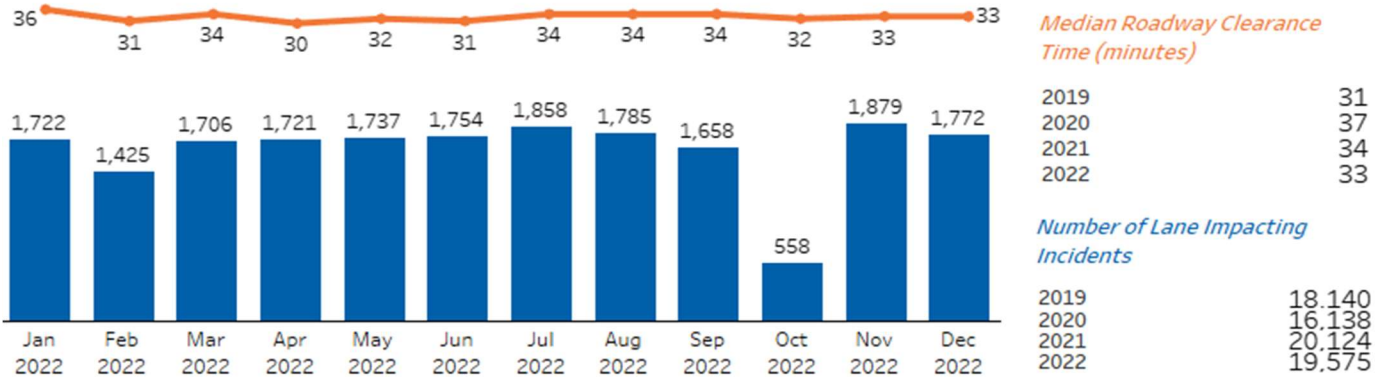
All Incidents by Detection Source





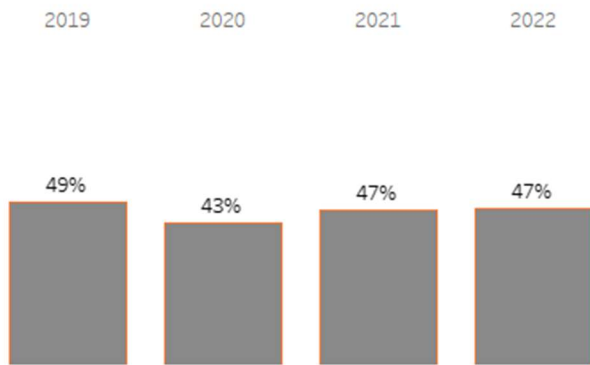
Lane Impacting Incidents & Roadway Clearance Time

Roadway Clearance Time (RCT) is measured for all disabled vehicle and crash incidents that block at least one travel lane during the course of the incident. RCT is measured from the start of the incident to when all travel lanes are clear and open to traffic. Some Data in October 2022 was permanently lost.

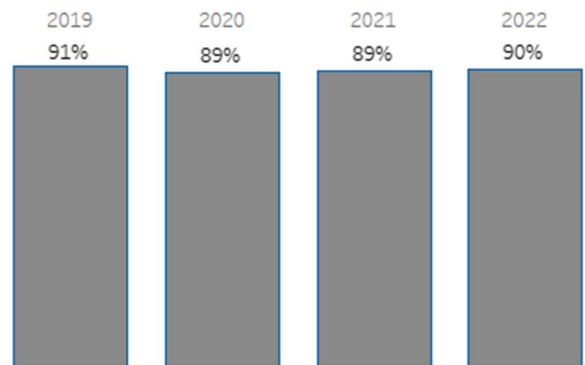


Lane Impacting Incidents by Roadway Clearance Time

Lane Impacting Incidents Cleared in <30 minutes

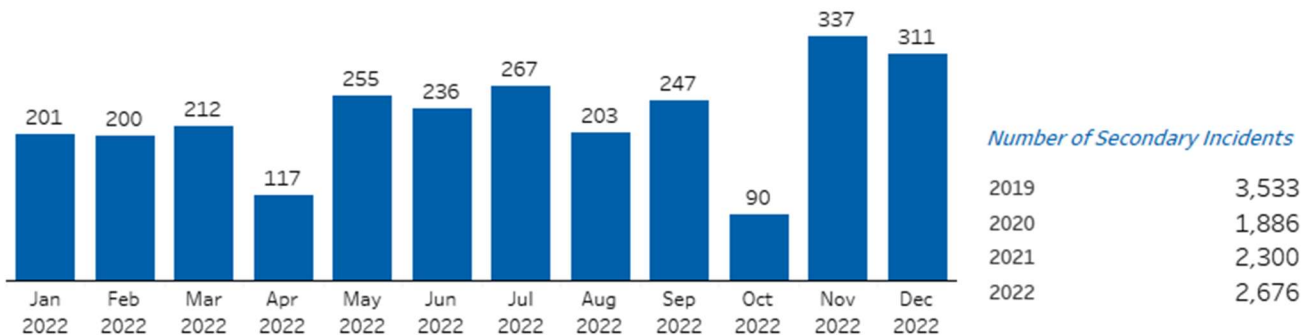


Lane Impacting Incidents Cleared in <90 minutes



Potential Secondary Incidents

The estimated number of crash incidents which could be secondary to other crash or disable vehicle incidents. Some Data in October 2022 was permanently lost.





Work Zones

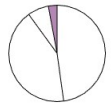
VDOT measures the number and types of work events and the impact on non-recurring congestion. The allowable work hours are regularly reviewed to promote safety and reduce congestion.

Work Zones by District

Work zone event data from VaTraffic.

	Number of Lane Impacting Work Zones		Miles-Hours of Lane Impacting Work Zones	
	2021	2022	2021	2022
Bristol	1,016	988	27,806	34,649
Culpeper	455	402	18,124	14,564
Fredericksburg	1,284	1,800	25,517	29,265
Hampton Roads	1,559	2,016	41,000	40,683
Northern Virginia	4,950	4,797	63,186	56,868
Richmond	2,465	3,563	32,675	97,792
Salem	1,937	1,549	47,381	62,562
Staunton	1,398	1,058	51,619	35,675
Grand Total	15,064	16,173	307,307	372,058

Work event types include: new roadway construction; road widening; resurfacing; paving; bridge replacement; bridge joint, approach, deck, and superstructure repairs; bridge inspections; pavement marking installation; ITS equipment repair and installation; tunnel cleaning; and overhead sign structure repairs. Long-term work zones (>7 days) were not included.



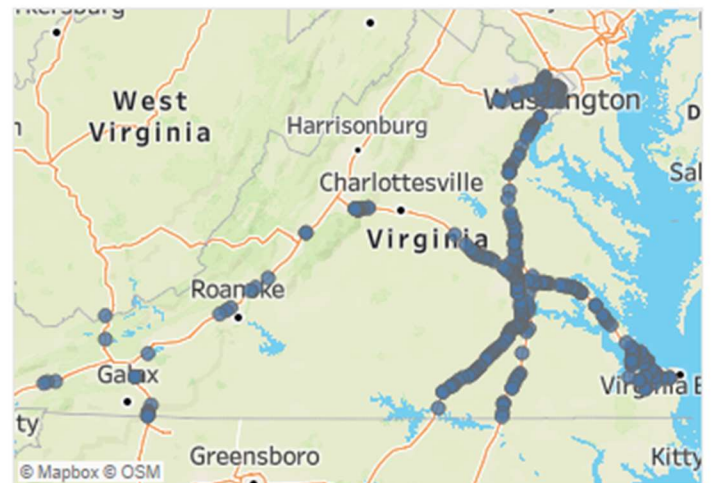
Weather

VDOT measures the number and types of weather events and the impact on non-recurring congestion. The data helps identify emerging maintenance trends.

Weather Type	2021	2022
Fog	494	526
High Wind	496	444
Icy Conditions	28	61
Other	313	189
Standing Water (Ponding)	107	116

Weather	Road Condition	2021	2022
Snow/Ice	Minor	62,644	98,453
	Moderate	29,927	36,720
	Severe	37	4,134
	Closed	2	278

Short Term Weather Events 2022





Operations Assets

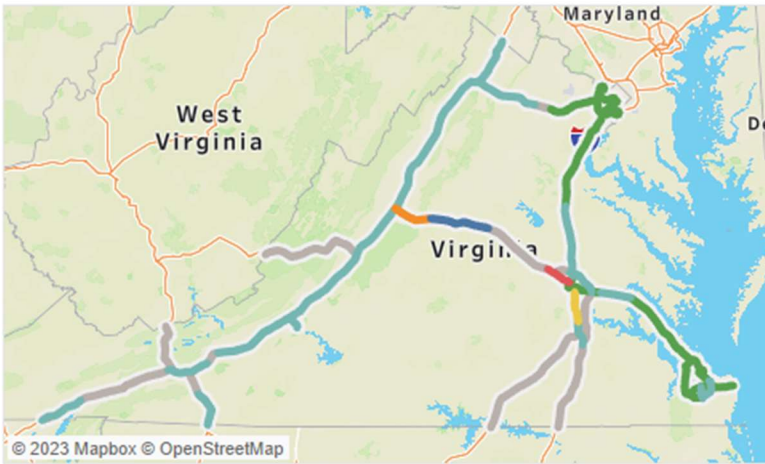
Cameras, Signs, and Safety Service Patrols are among the tools used to manage and minimize traffic congestion due to both recurring and non-recurring causes. VDOT measures the coverage areas and condition of these assets that help monitor traffic and improve mobility.

ITS Assets Availability

Device Type	Number of Devices	% of Time Devices were Online
CCTV	1,024	94.3%
CCTV Portable	59	97.9%
CMS	464	94.5%
CMS Portable	104	96.5%

Safety Service Patrol Coverage

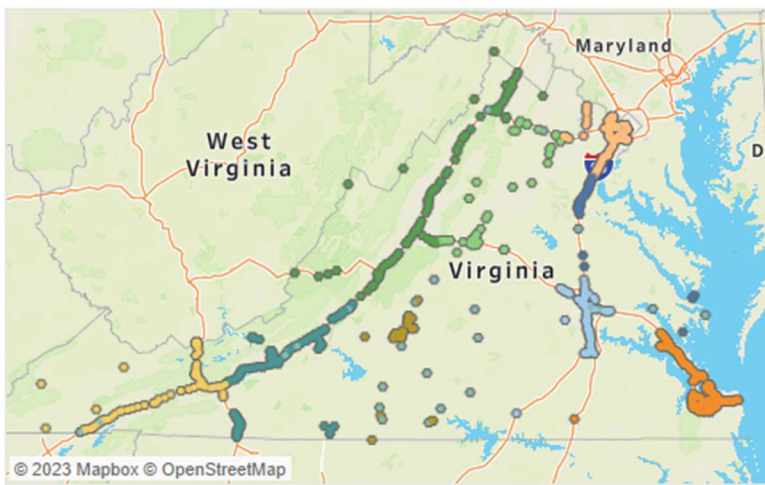
Coverage as of December 31, 2022



Interstates	Miles Covered	% Miles Covered	Mile-Hours Covered / Week	% Mile-Hours / Week
I-64	140	53%	21,564	48%
I-66	66	88%	9,352	74%
I-77	19	32%	2,128	21%
I-81	268	82%	30,016	55%
I-85	0	0%	0	0%
I-95	120	67%	18,666	62%
I-295	15	28%	1,680	19%
I-495	22	100%	3,696	100%
Other	72	94%	12,040	93%
Grand Total	722	64%	99,142	53%

Camera Coverage

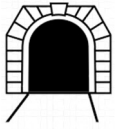
Cameras (CCTV) as of December 31, 2022



Interstates	Directional Miles of Camera Coverage	Estimated % Miles Covered by CCTV
I-64	216	41%
I-66	55	37%
I-77	58	49%
I-81	295	45%
I-85	14	10%
I-95	144	41%
I-295	7	7%
I-495	43	97%
Other	112	73%
Grand Total	945	42%

Coverage assumes that cameras can only see one side of the interstate unless it is in the median. 1 mile upstream and downstream assumed to be covered by each camera.

- Bristol
- Fredericksburg
- Lynchburg
- Richmond
- Staunton
- Culpeper
- Hampton Roads
- Northern Virginia
- Salem
- Other



Special Facilities Operations

VDOT owns and operates tunnels, movable bridges, and auto-ferry systems across the state. Incidents which result in closures at any of these facilities can create significant bottlenecks as they provides limited transportation services at a unique geographic feature.

Tunnels

VaTraffic incidents and work zones for 2022

Facility	Type	Hours of Unplanned Lane Impacting Activities*	Hours of Planned Lane Impacting Activities**
I-64 Hampton Roads Bridge Tunnel	Underwater	551	784
I-664 Monitor Merrimac Memorial Bridge Tunnel	Underwater	263	402
I-264 Downtown Tunnel	Underwater	5	384
US 58 Midtown Tunnel	Underwater	6	264
I-77 Big Walker Mountain Tunnel	Mountain	26	232
I-77 East River Mountain Tunnel	Mountain	75	910

*Unplanned activities includes tunnel stoppage due to dangerous cargo, over-height detection, farm equipment, debris, wide loads, state police activity, or other emergency maintenance.

**Planned activities includes median/jersey wall repair/installation, paving operations, litter pickup operations, pothole patching operations, rumble strip installation, shoulder repairs, storm drain work, tunnel cleaning operations, and other planned maintenance. This does not include planned construction projects.

Movable Bridges

VaTraffic incidents and work zones for 2022

Facility	# Lifts	Hours Under Advisory for Weather	Hours of Unplanned Lane Impacting Activities*	Hours of Planned Lane Impacting Activities**
I-264 Berkley Bridge	860	0	0	0
I-664 High Rise Bridge	39	156	0	0
US 17 Coleman Bridge	100	834	0	0
VA 156 Benjamin Harrison Bridge	1048	3	0	0
VA 33 Eltham Bridge	25	0	0	0
US 17 James River Bridge	730	175	0	0
VA 223 Gwynn’s Island	2693	0	0	0
VA 175 Chincoteague Bridge	270	n/a	n/a	n/a

* Unplanned activities includes bridge stoppage due to activities such as dangerous cargo, over-height detection, farm equipment, debris, wide loads, state police activity, or other emergency maintenance.

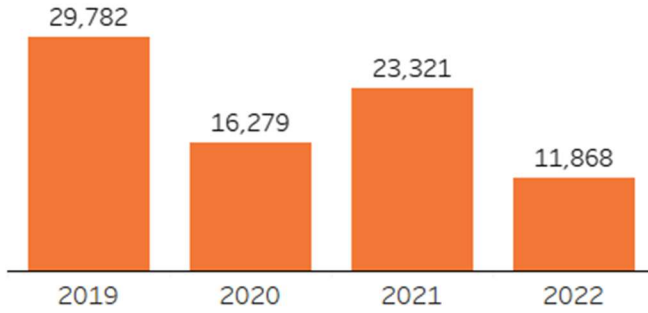
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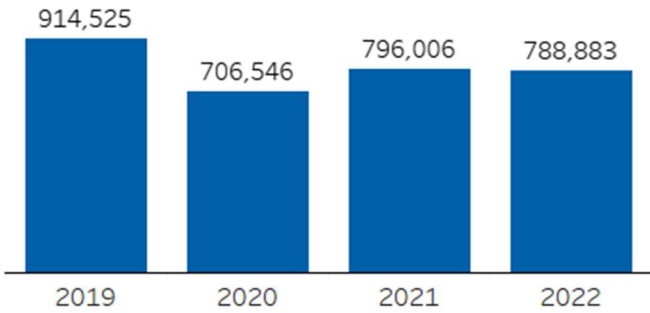
Auto-Ferries

VaTraffic incidents and work zones for 2022

Jamestown-Scotland Ferry - Vehicles Left on Dock



Jamestown-Scotland Ferry - Total Traffic



Facility	Hours under Advisory/Closure for Weather	Hours Closed Due to Maintenance
Jamestown-Scotland Ferry	34	245
Merry Point Ferry	0	0
Sunny Bank Ferry	0	0



Bristol District

This report compares performance of Interstate Highways from 2021 to 2022

Measure		Target	2021	2022
Total Vehicle Hours of Delay on Interstates The additional hours travelers waited in traffic that is moving 20 mph less than free-flow speed		↘	272K	293K
ALL INCIDENTS	All Roads All Reported Incidents Number of disabled vehicle and crash incidents	N/A	3,640	3,650
	Interstates All Reported Incidents Number of disabled vehicle and crash incidents	N/A	2,748	2,744
	Interstates Scene Clearance Time Median time from verifying the incident to opening all lanes and shoulders	↘	19	19
	Interstates Potential Secondary Crash Incidents Estimated # of crash incidents which could be secondary to other incidents	↘	2,753	2,749
LANE IMPACTING INCIDENTS	All Roads Lane Impacting Incidents # of disabled vehicle and crash incidents that block at least one travel lane	N/A	702	685
	Interstates Lane Impacting Incidents # of disabled vehicle and crash incidents that block at least one travel lane	N/A	486	460
	Interstates Roadway Clearance Time Median time from verifying the incident to opening all travel lanes to traffic	↘	38	42
	Interstates Lane Impacting Incidents Cleared in < 30 minutes Percentage of Lane Impacting Incidents that are cleared in less than 30 min	38%	36%	38%
	Interstates Lane Impacting Incidents Cleared in < 90 minutes Percentage of Lane Impacting Incidents that are cleared in less than 90 min	81%	88%	86%

Congestion in 2022

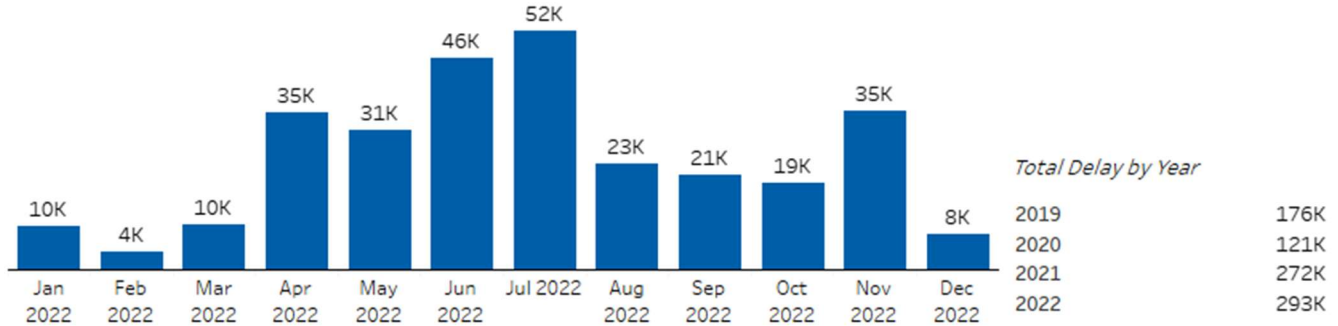




Congestion Overview

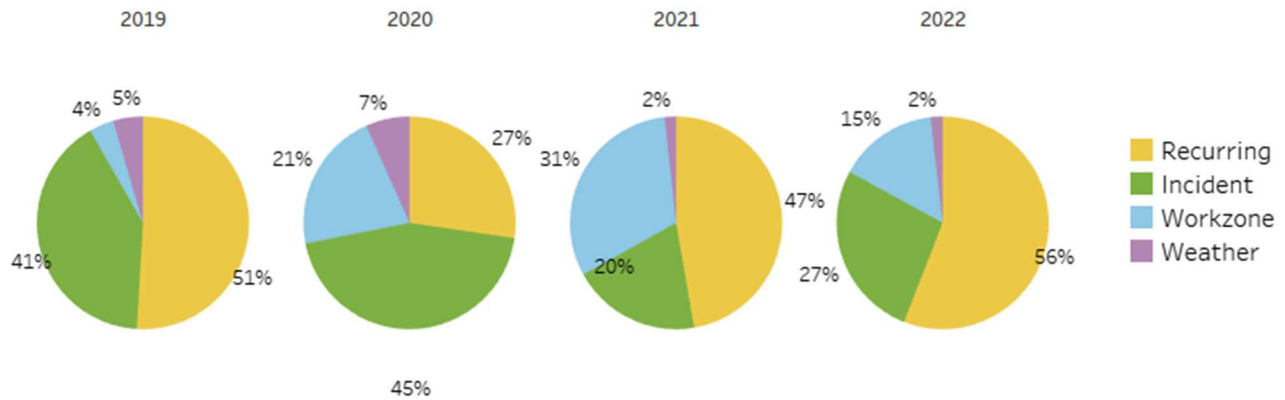
Vehicle Hours of Delay

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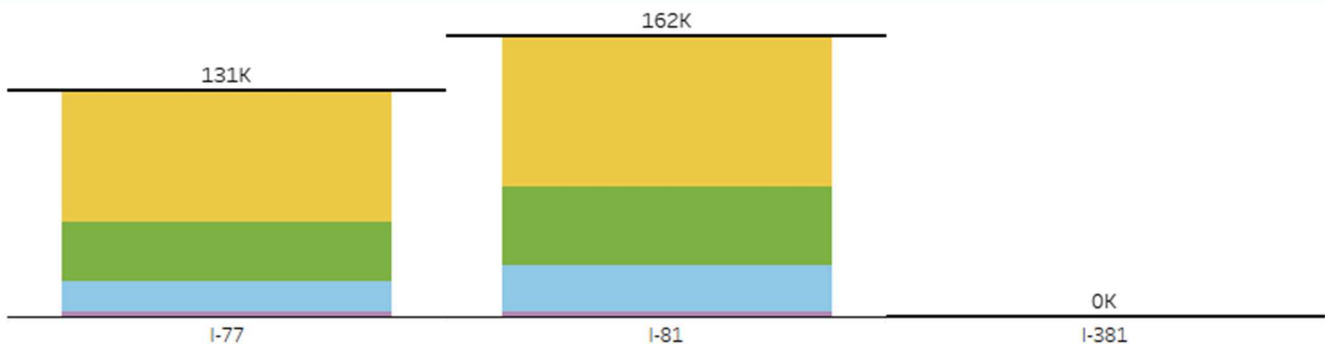


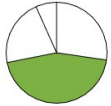
Causes of Congestion

Congestion can be broken down into recurring and non-recurring sources. Recurring congestion is caused by bottlenecks due to high volume or geometric constraints. Sources of non-recurring congestion on interstates include incidents, work zones, and weather events. The amount of congestion due to each of these sources can be estimated at a planning level as shown below.



Delay by Cause & Interstate in 2022



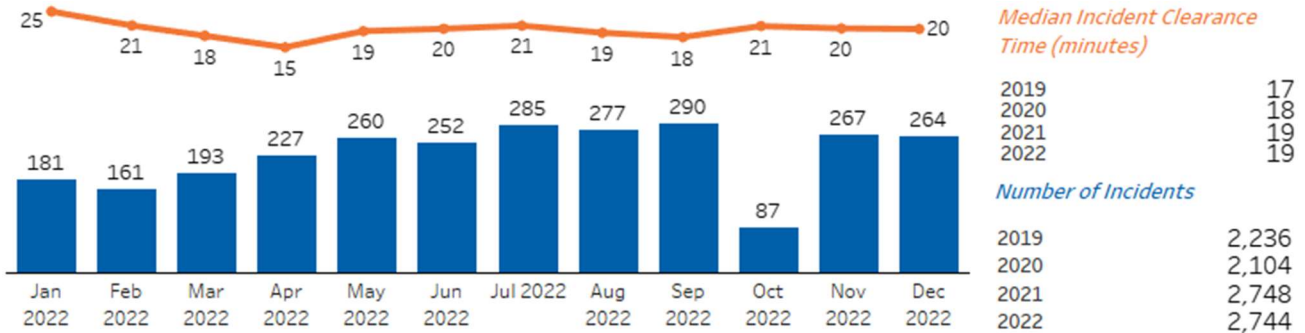


Incidents

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Total Incidents & Incident Clearance Time

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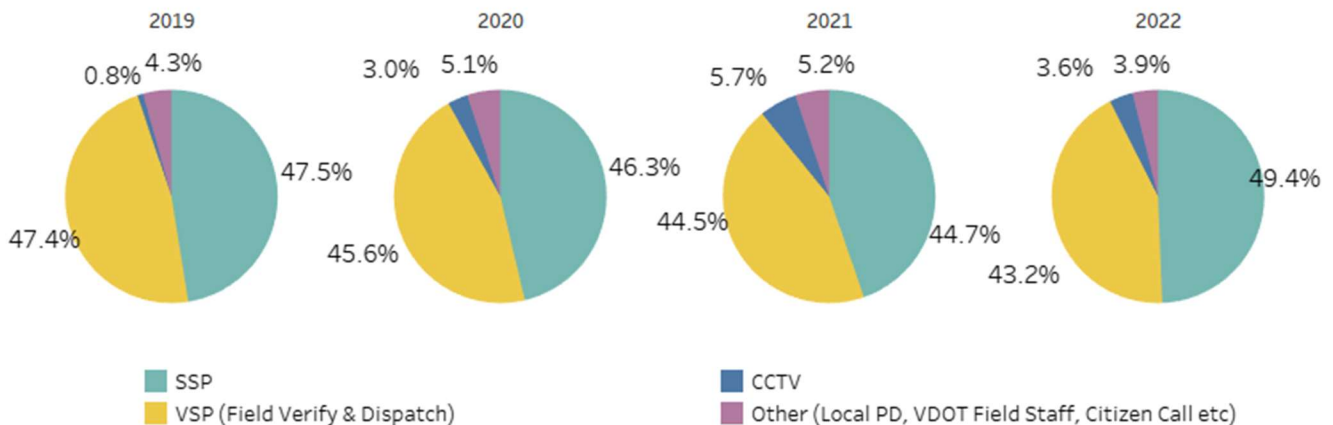


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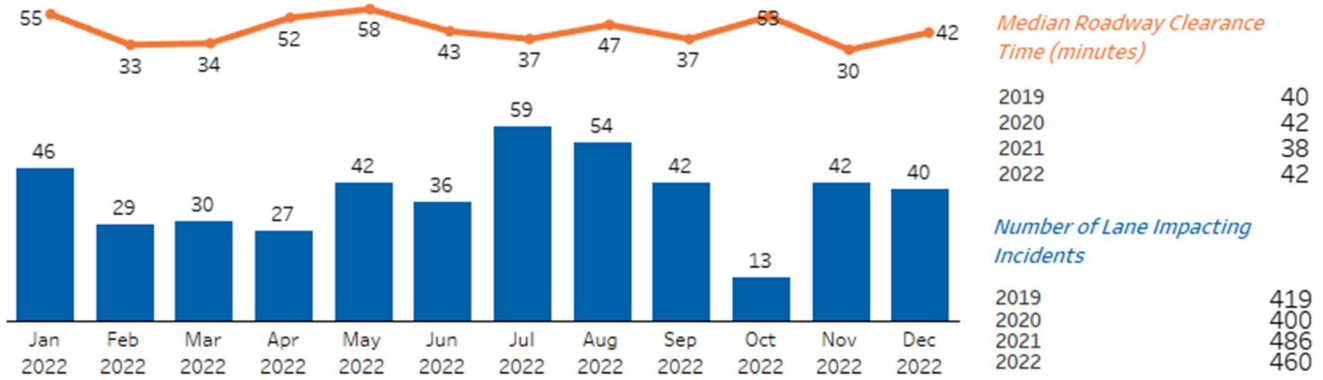


All Incidents by Detection Source



Lane Impacting Incidents & Roadway Clearance Time

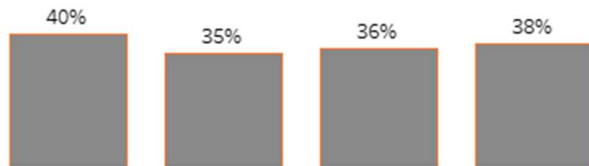
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Lane Impacting Incidents by Roadway Clearance Time

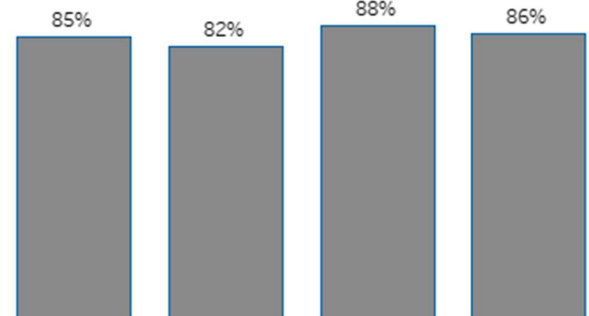
Lane Impacting Incidents Cleared in <30 minutes

2019 2020 2021 2022



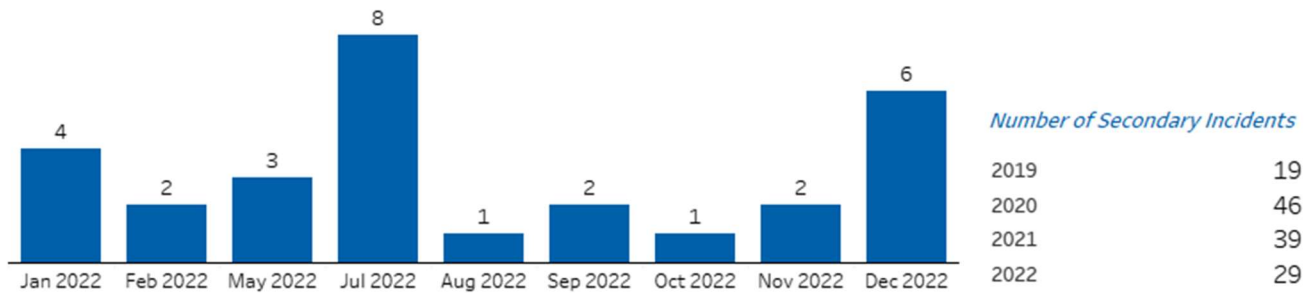
Lane Impacting Incidents Cleared in <90 minutes

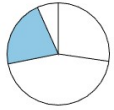
2019 2020 2021 2022



Potential Secondary Incidents

The estimated number of crash incidents which could be secondary to other crash or disable vehicle incidents.





Work Zones

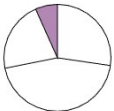
VDOT measures the number and types of work events and the impact on non-recurring congestion. The allowable work hours are regularly reviewed to promote safety and reduce congestion.

Work Zones by Interstate

Work zone event data from VaTraffic

	Number of Lane Impacting Work Zones		Miles-Hours of Lane Impacting Work Zones	
	2021	2022	2021	2022
I-77	403	367	8,381	14,431
I-81	612	620	19,418	20,215
Grand Total	1,015	987	27,799	34,645

Work event types include: new roadway construction; road widening; resurfacing; paving; bridge replacement; bridge joint, approach, deck, and superstructure repairs; bridge inspections; pavement marking installation; ITS equipment repair and installation; tunnel cleaning; and overhead sign structure repairs. Long-term work zones (>7 days) were not included.



Weather

VDOT measures the number and types of weather events and the impact on non-recurring congestion. The data helps identify emerging maintenance trends.

Weather Type	2021	2022
High Wind		1
Other	5	4

Weather	Road Condition	2021	2022
Snow/Ice	Minor	9,468	10,206
	Moderate	2,589	4,414

Short Term Weather Events 2022





Operations Assets

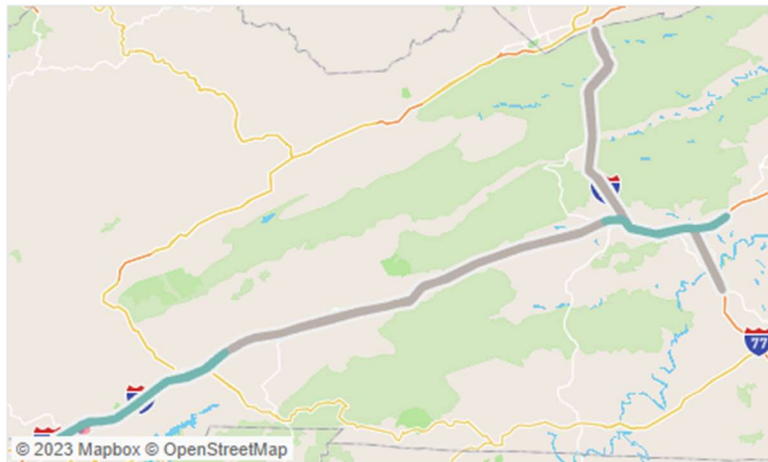
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ITS Assets Availability – SWRO, 2022

Device Type	Number of Devices	% of Time Devices were Online
CCTV	240	96.5%
CCTV Portable	18	99.5%
CMS	95	98.6%
CMS Portable	26	94.1%

Safety Service Patrol Coverage

Coverage as of December 31, 2022



Interstates	Miles Covered	% Miles Covered	Mile-Hours Covered / Week	% Mile-Hours / Week
I-77	0	0%	0	0%
I-81	44	51%	4,256	29%
Other	0	0%	0	0%
Grand Total	44	36%	4,256	21%

SSP Coverage Legend (Hours Per Day/Days Per Week)
 ■ 16/7 ■ I-381N ■ I-381S ■ No SSP

Camera Coverage

Cameras (CCTV) as of December 31, 2022



Interstates	Directional Miles of Camera Coverage	Estimated % Miles Covered by CCTV
I-77	30	43%
I-81	73	43%
Other	1	41%
Grand Total	104	43%

Coverage assumes that cameras can only see one side of the interstate unless it is in the median. 1 mile upstream and downstream assumed to be covered by each camera.

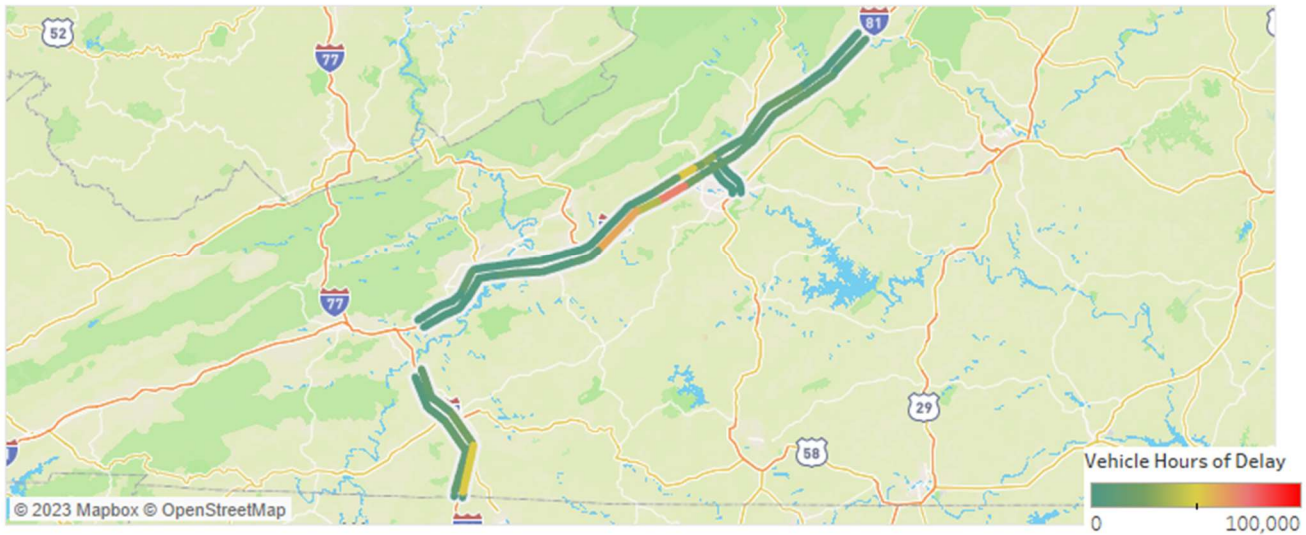


Salem District

This report compares performance of Interstate Highways from 2021 to 2022

Measure		Target	2021	2022
Total Vehicle Hours of Delay on Interstates The additional hours travelers waited in traffic that is moving 20 mph less than free-flow speed		↘	448K	708K
ALL INCIDENTS	All Roads All Reported Incidents Number of disabled vehicle and crash incidents	N/A	8,342	7,430
	Interstates All Reported Incidents Number of disabled vehicle and crash incidents	N/A	6,452	5,527
	Interstates Scene Clearance Time Median time from verifying the incident to opening all lanes and shoulders	↘	17	20
	Interstates Potential Secondary Crash Incidents Estimated # of crash incidents which could be secondary to other incidents	↘	6,456	5,543
LANE IMPACTING INCIDENTS	All Roads Lane Impacting Incidents # of disabled vehicle and crash incidents that block at least one travel lane	N/A	1,519	1,581
	Interstates Lane Impacting Incidents # of disabled vehicle and crash incidents that block at least one travel lane	N/A	817	860
	Interstates Roadway Clearance Time Median time from verifying the incident to opening all travel lanes to traffic	↘	46	50
	Interstates Lane Impacting Incidents Cleared in < 30 minutes Percentage of Lane Impacting Incidents that are cleared in less than 30 min	33%	35%	32%
	Interstates Lane Impacting Incidents Cleared in < 90 minutes Percentage of Lane Impacting Incidents that are cleared in less than 90 min	81%	83%	82%

Congestion in 2022

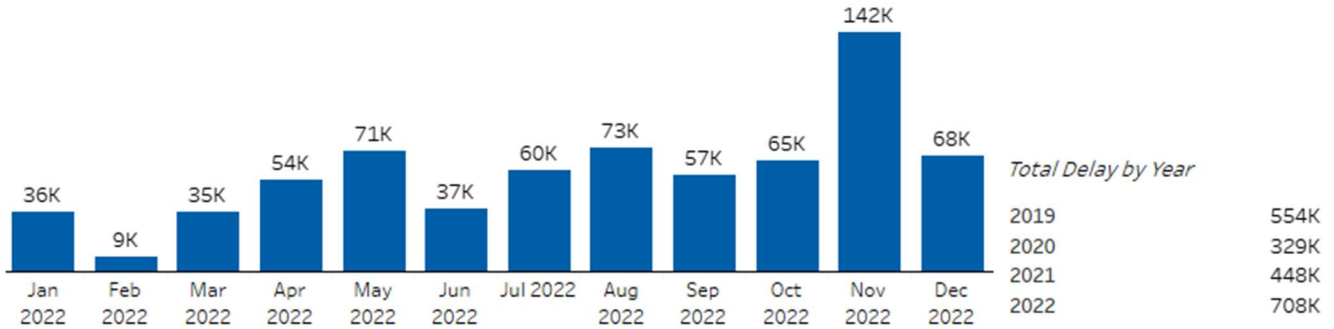




Congestion Overview

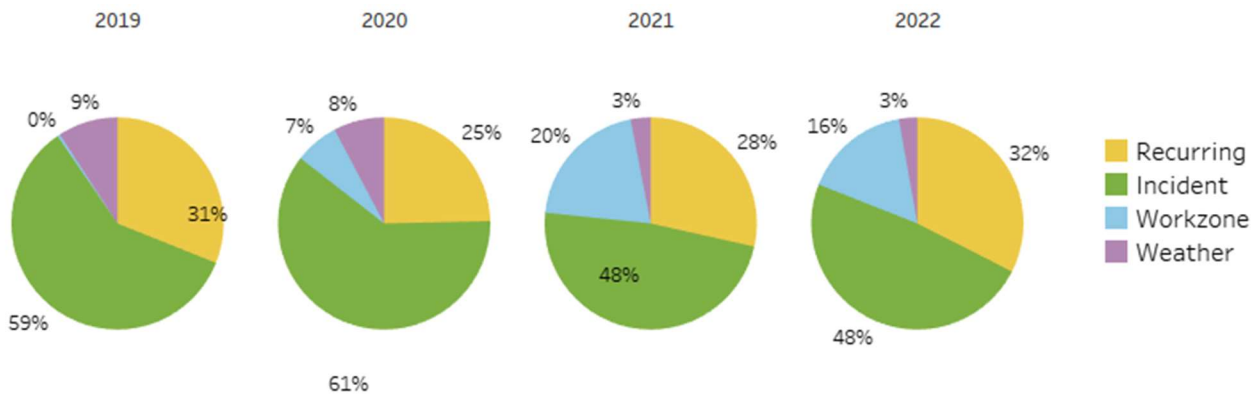
Vehicle Hours of Delay

Total Delay is calculated using INRIX probe speed data and historical VDOT volumes. Delay is calculated when the observed speed is 20 mph or more below free flow conditions.

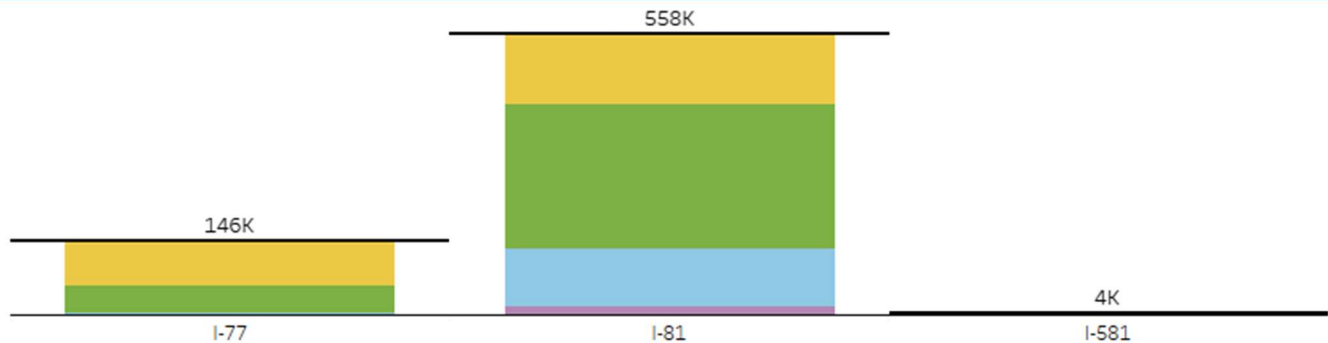


Causes of Congestion

Congestion can be broken down into recurring and non-recurring sources. Recurring congestion is caused by bottlenecks due to high volume or geometric constraints. Sources of non-recurring congestion on interstates include incidents, work zones, and weather events. The amount of congestion due to each of these sources can be estimated at a planning level as shown below.



Delay by Cause & Interstate in 2022





Incidents

Traffic incidents includes both crashes and disabled vehicles and are a frequent cause of non-recurring congestion. Quick clearance programs such as Safety Service Patrols, incident management coordination, and after-action review with the Virginia State Police (VSP) and the other first responders can influence the effects of incidents on traffic.

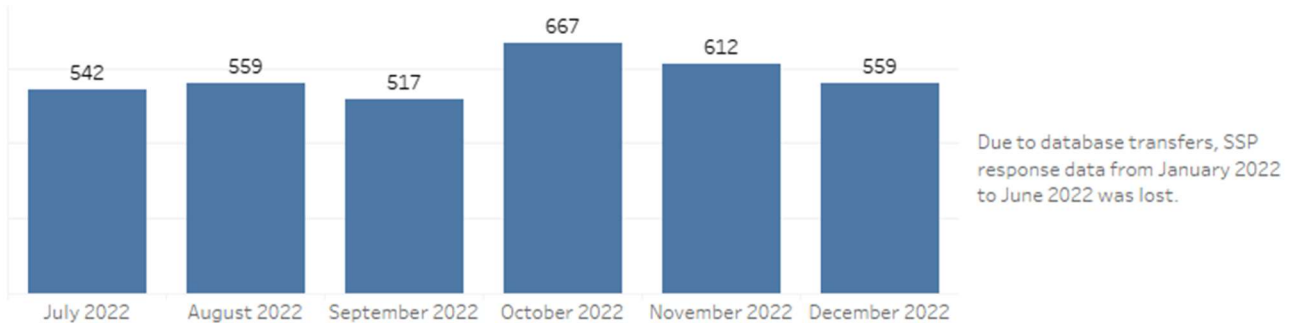
Total Incidents & Incident Clearance Time

Incident Clearance Time (also called Scene Clearance Time) is measured for all crash and disabled vehicle incidents on travel lanes and shoulders. Median Incident Clearance Time is shorter than Median Roadway Clearance Time because it is measured for all incidents, not just those which are lane impacting. A simple incident on a shoulder, such as a vehicle with a flat tire, is often quick to clear. Some Data in October 2022 was permanently lost.

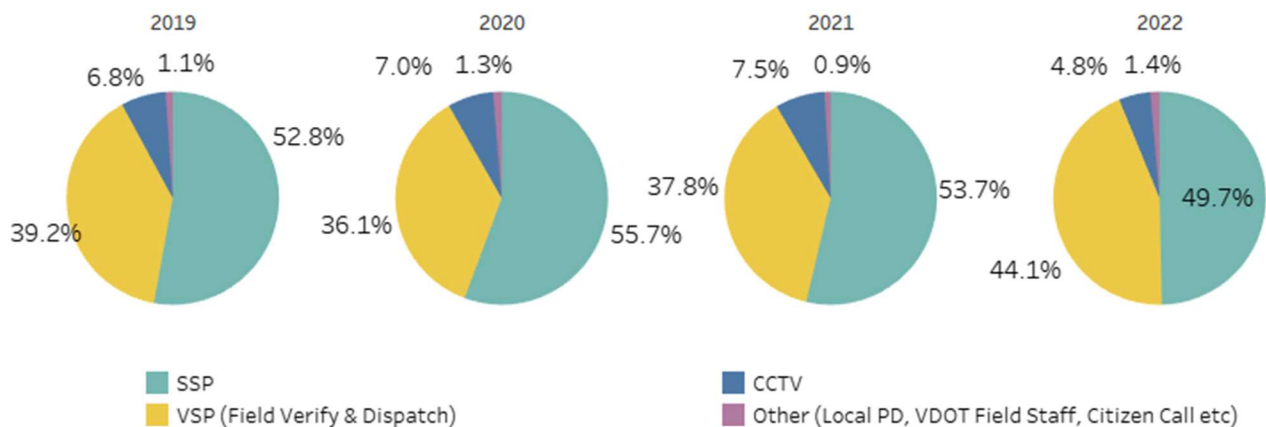


Safety Service Patrol Incident Responses & Response Time

Safety Service Patrol (SSP) Response Time is measured in minutes from the time the SSP Operator was notified to the time they arrived on Scene. This is measured for all disabled vehicle and crash incidents, which an SSP responded to. (Average Response Time between 2 and 60 minutes is measured)



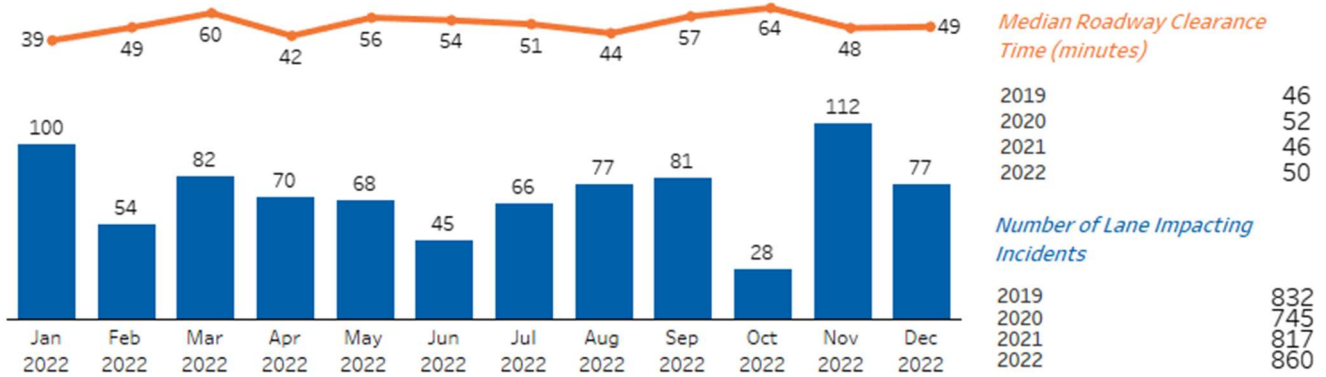
All Incidents by Detection Source





Lane Impacting Incidents & Roadway Clearance Time

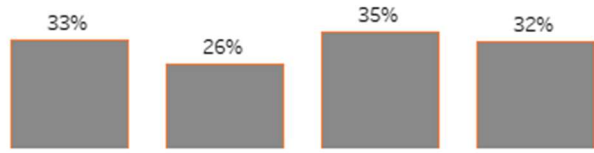
Roadway Clearance Time (RCT) is measured for all disabled vehicle and crash incidents that block at least one travel lane during the course of the incident. RCT is measured from the start of the incident to when all travel lanes are clear and open to traffic.



Lane Impacting Incidents by Roadway Clearance Time

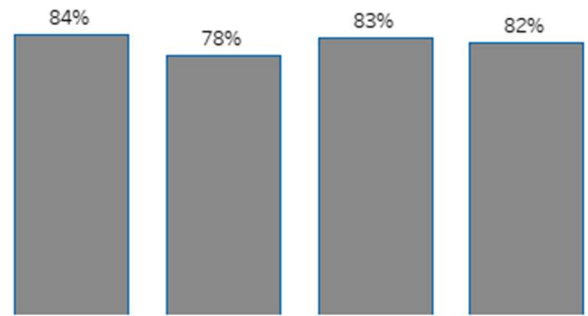
Lane Impacting Incidents Cleared in <30 minutes

2019 2020 2021 2022



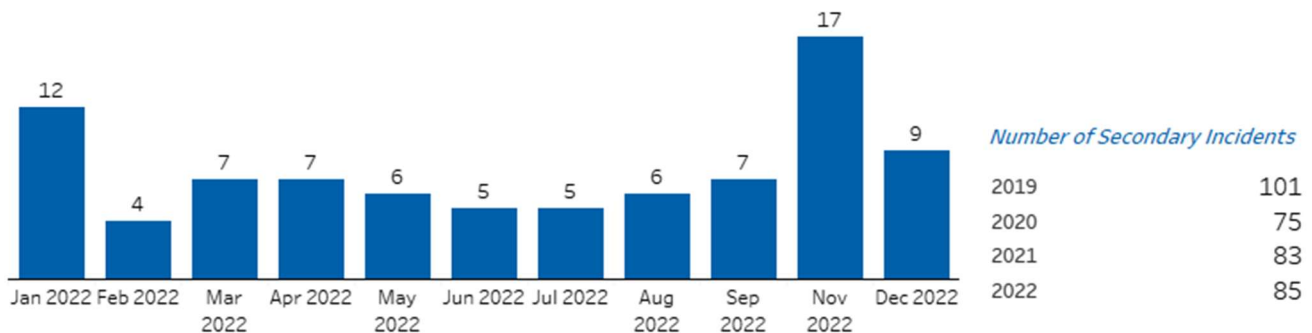
Lane Impacting Incidents Cleared in <90 minutes

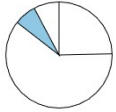
2019 2020 2021 2022



Potential Secondary Incidents

The estimated number of crash incidents which could be secondary to other crash or disable vehicle incidents.





Work Zones

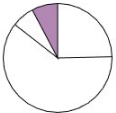
VDOT measures the number and types of work events and the impact on non-recurring congestion. The allowable work hours are regularly reviewed to promote safety and reduce congestion.

Work Zones by Interstate

Work zone event data from VaTraffic

	Number of Lane Impacting Work Zones		Miles-Hours of Lane Impacting Work Zones	
	2021	2022	2021	2022
I-77	239	119	7,326	3,594
I-81	1,539	1,346	37,045	56,879
I-581	159	84	3,010	2,089
Grand Total	1,937	1,549	47,381	62,562

Work event types include: new roadway construction; road widening; resurfacing; paving; bridge replacement; bridge joint, approach, deck, and superstructure repairs; bridge inspections; pavement marking installation; ITS equipment repair and installation; tunnel cleaning; and overhead sign structure repairs. Long-term work zones (>7 days) were not included.



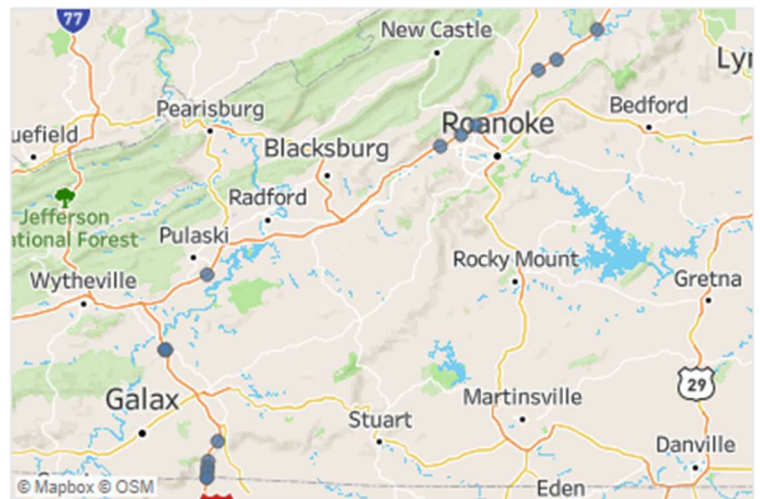
Weather

VDOT measures the number and types of weather events and the impact on non-recurring congestion. The data helps identify emerging maintenance trends.

Weather Type	2021	2022
Fog	207	239
High Wind	391	298
Other	3	9

Weather	Road Condition	2021	2022
Snow/Ice	Minor	5,045	5,696
	Moderate	2,209	4,973
	Severe		284

Short Term Weather Events 2022





Operations Assets

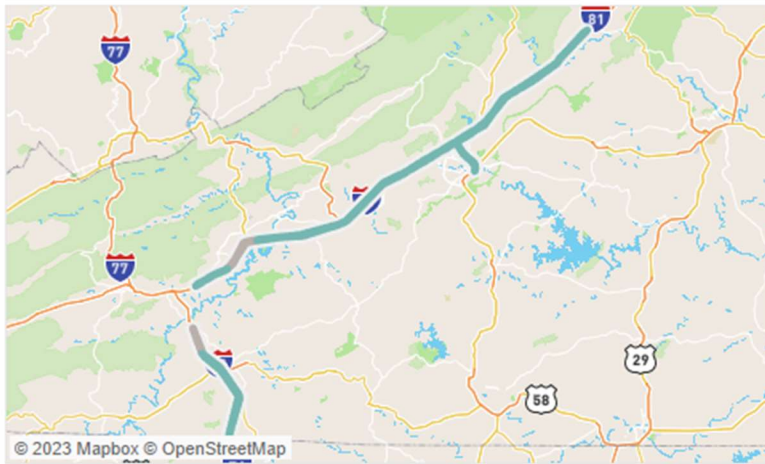
Cameras, Signs, and Safety Service Patrols are among the tools used to manage and minimize traffic congestion due to both recurring and non-recurring causes. VDOT measures the coverage areas and condition of these assets that help monitor traffic and improve mobility.

ITS Assets Availability - SWRO, 2022

Device Type	Number of Devices	% of Time Devices were Online
CCTV	240	96.5%
CCTV Portable	18	99.5%
CMS	95	98.6%
CMS Portable	26	94.1%

Safety Service Patrol Coverage

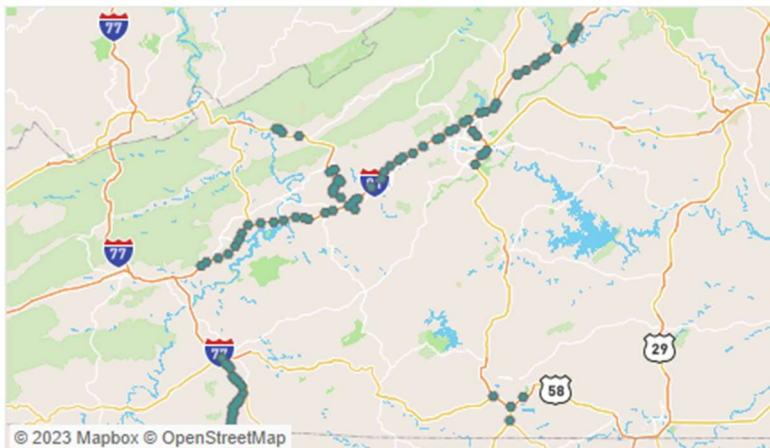
Coverage as of December 31, 2022



Interstate	Miles Covered	% Miles Covered	Mile-Hours Covered / Week	% Mile-Hours / Week
I-77	19	79%	2,128	53%
I-81	74	83%	8,960	60%
I-581	6	100%	672	67%
Grand Total	99	83%	11,760	59%

Camera Coverage

Cameras (CCTV) as of December 31, 2022



Interstate	Directional Miles of Camera Coverage	Estimated % Miles Covered by CCTV
I-77	28	59%
I-81	93	52%
I-581	9	76%
Grand Total	131	55%

Coverage assumes that cameras can only see one side of the interstate unless it is in the median. 1 mile upstream and downstream is assumed to be covered by each camera.

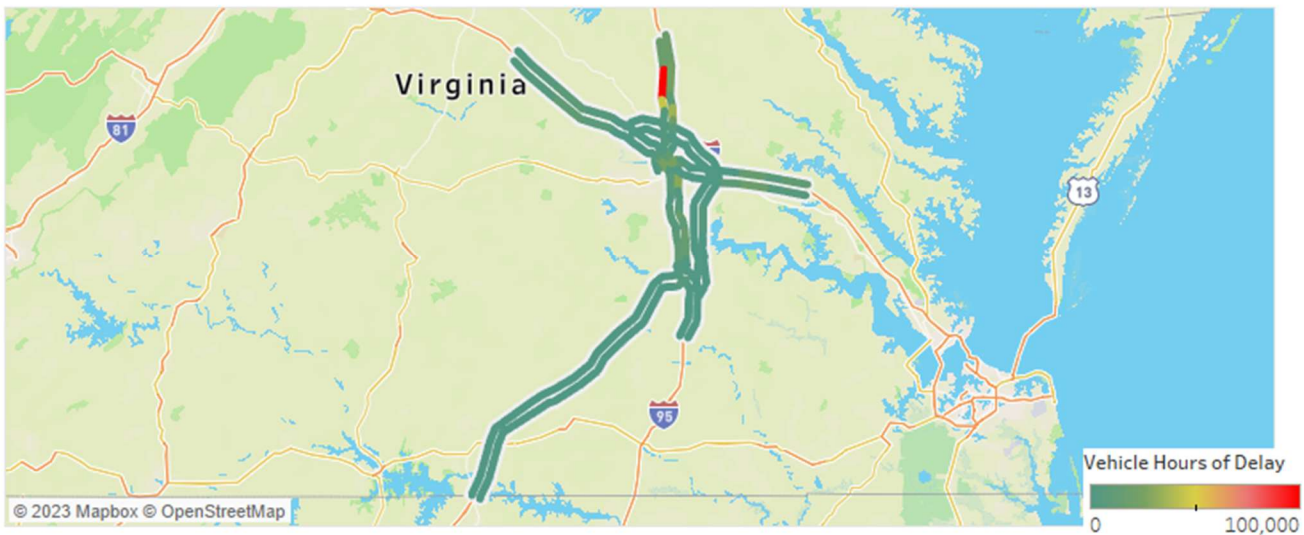


Richmond District

This report compares performance of Interstate Highways from 2021 to 2022

Measure		Target	2021	2022
Total Vehicle Hours of Delay on Interstates The additional hours travelers waited in traffic that is moving 20 mph less than free-flow speed		↘	1,314K	817K
ALL INCIDENTS	All Reported Incidents Number of disabled vehicle and crash incidents	N/A	24,232	25,048
	All Reported Incidents Number of disabled vehicle and crash incidents	N/A	20,368	21,196
	Scene Clearance Time Median time from verifying the incident to opening all lanes and shoulders	↘	20	21
	Potential Secondary Crash Incidents Estimated # of crash incidents which could be secondary to other incidents	↘	20,380	21,250
LANE IMPACTING INCIDENTS	Lane Impacting Incidents # of disabled vehicle and crash incidents that block at least one travel lane	N/A	4,926	4,675
	Lane Impacting Incidents # of disabled vehicle and crash incidents that block at least one travel lane	N/A	3,648	3,459
	Roadway Clearance Time Median time from verifying the incident to opening all travel lanes to traffic	↘	42	42
	Lane Impacting Incidents Cleared in < 30 minutes Percentage of Lane Impacting Incidents that are cleared in less than 30 min	42%	40%	39%
	Lane Impacting Incidents Cleared in < 90 minutes Percentage of Lane Impacting Incidents that are cleared in less than 90 min	86%	86%	86%

Congestion in 2022

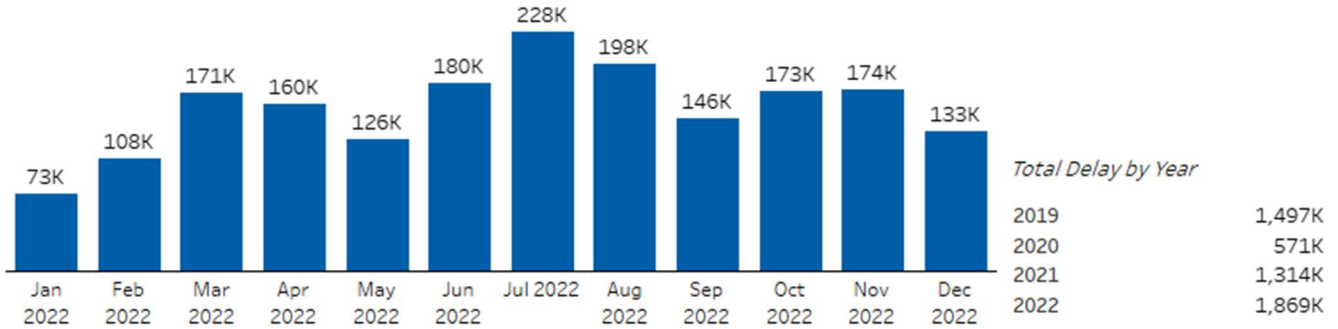




Congestion Overview

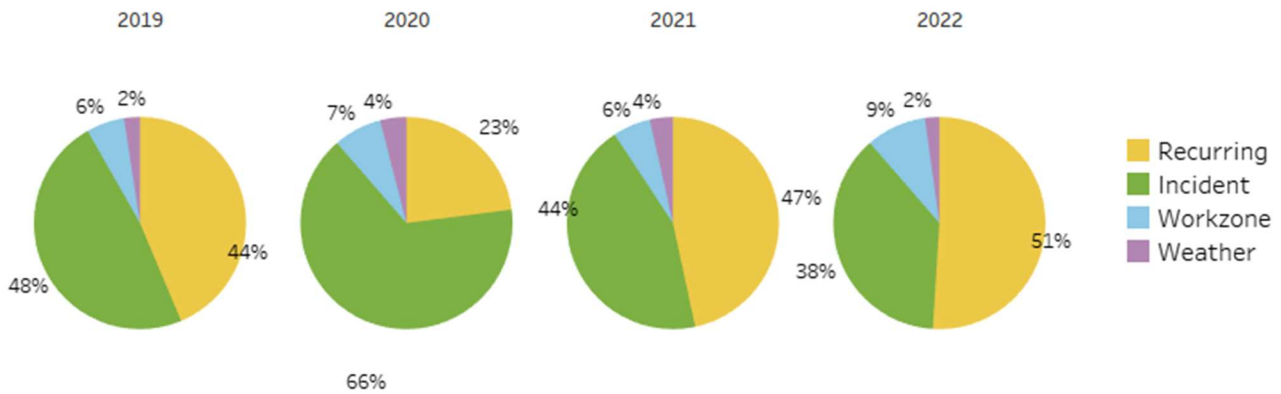
Vehicle Hours of Delay

Total Delay is calculated using INRIX probe speed data and historical VDOT volumes. Delay is calculated when the observed speed is 20 mph or more below free flow conditions.

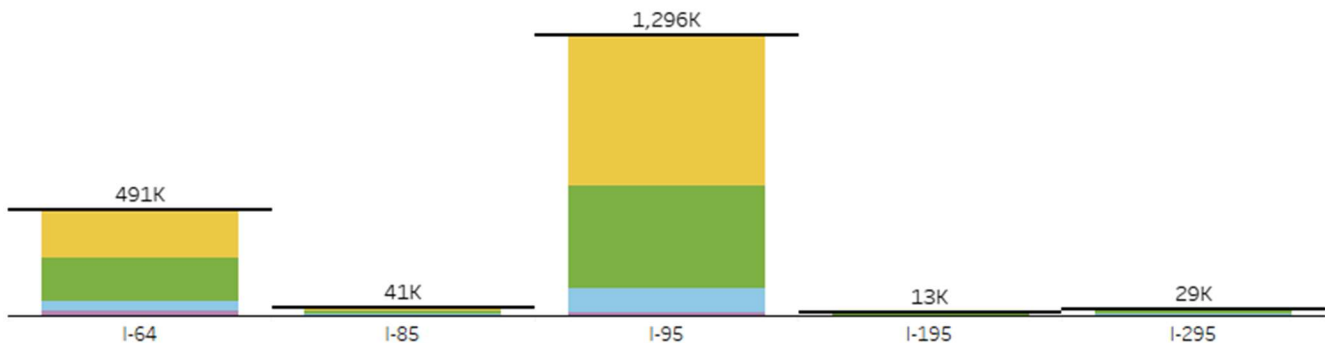


Causes of Congestion

Congestion can be broken down into recurring and non-recurring sources. Recurring congestion is caused by bottlenecks due to high volume or geometric constraints. Sources of non-recurring congestion on interstates include incidents, work zones, and weather events. The amount of congestion due to each of these sources can be estimated at a planning level as shown below.



Delay by Cause & Interstate in 2022



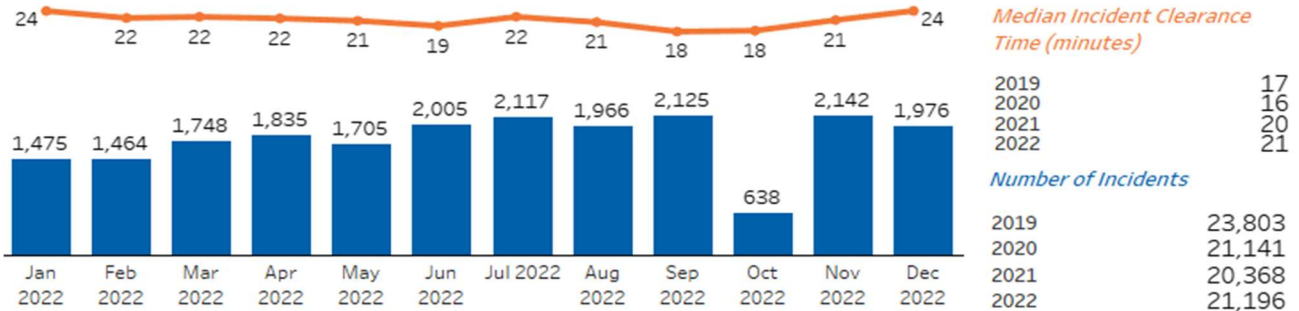


Incidents

Traffic incidents includes both crashes and disabled vehicles and are a frequent cause of non-recurring congestion. Quick clearance programs such as Safety Service Patrols, incident management coordination, and after-action review with the Virginia State Police (VSP) and the other first responders can influence the effects of incidents on traffic.

Total Incidents & Incident Clearance Time

Incident Clearance Time (also called Scene Clearance Time) is measures for all crash and disabled vehicle incidents on travel lanes and shoulders. Median Incident Clearance Time is shorter than Median Roadway Clearance Time because it is measures for all incidents, not just those which are lane impacting. A simple incident on a shoulder, such as a vehicle with a flat tire, is often quick to clear. Some Data in October 2022 was permanently lost.

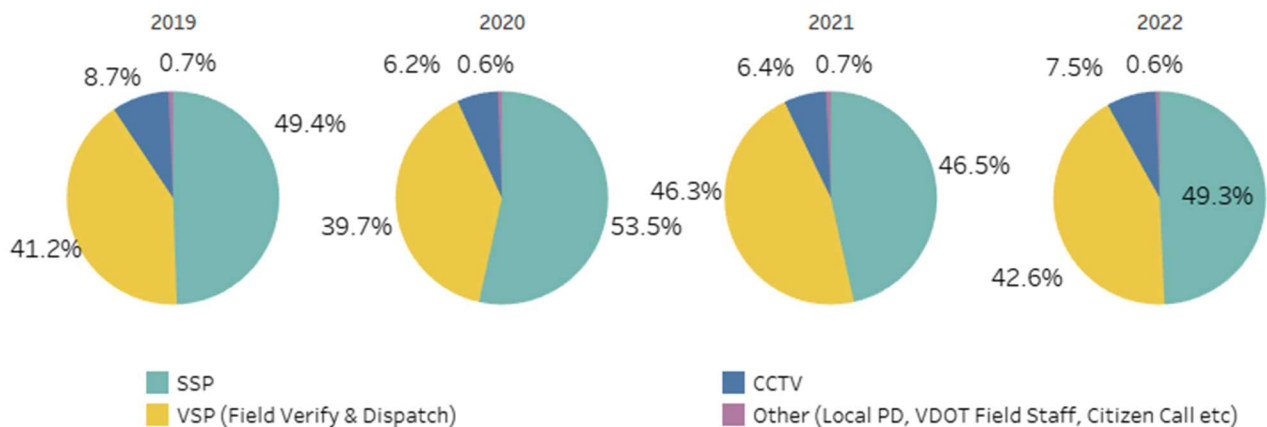


Safety Service Patrol Incident Responses & Response Time

Safety Service Patrol (SSP) Response Time is measured in minutes from the time the SSP Operator was notified to the time they arrived on Scene. This is measured for all disabled vehicle and crash incidents, which an SSP responded to. (Average Response Time between 2 and 60 minutes is measured)



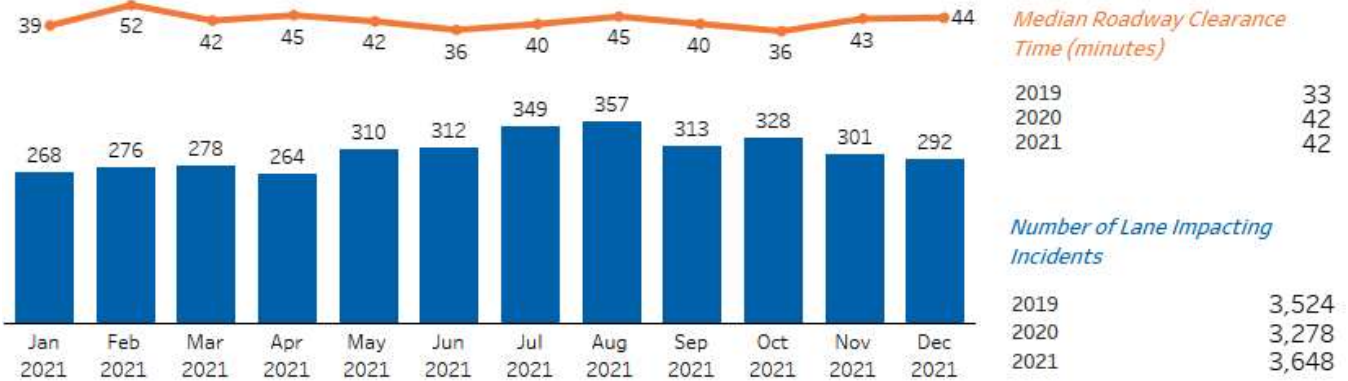
All Incidents by Detection Source





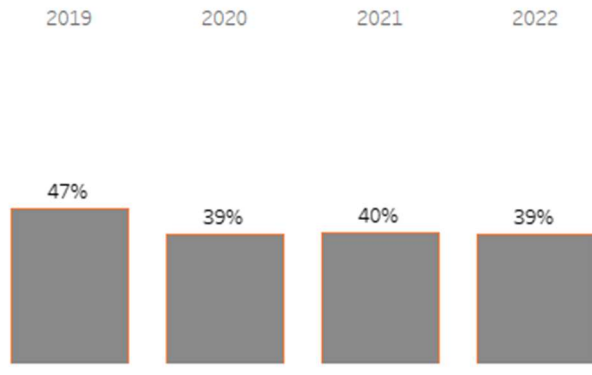
Lane Impacting Incidents & Roadway Clearance Time

Roadway Clearance Time (RCT) is measured for all disabled vehicle and crash incidents that block at least one travel lane during the course of the incident. RCT is measured from the start of the incident to when all travel lanes are clear and open to traffic.

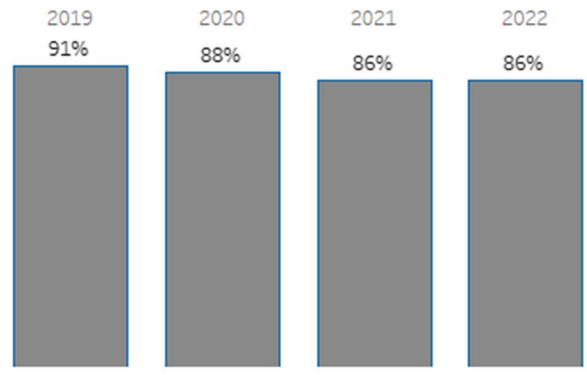


Lane Impacting Incidents by Roadway Clearance Time

Lane Impacting Incidents Cleared in <30 minutes

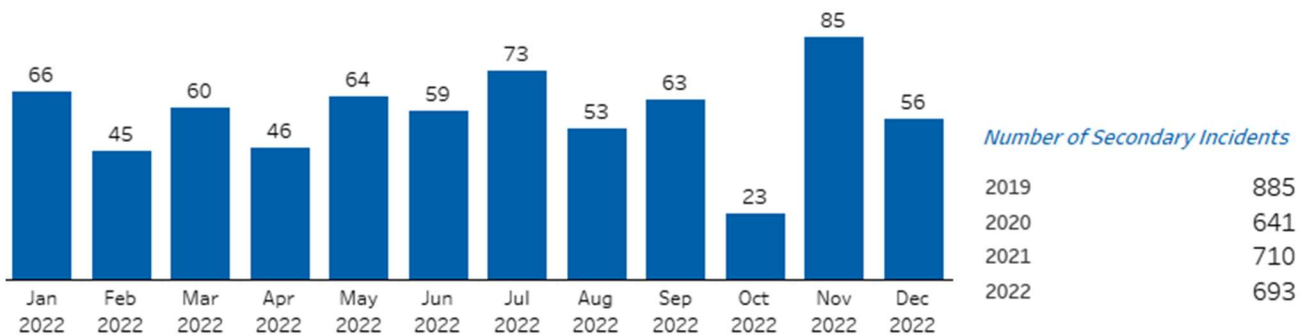


Lane Impacting Incidents Cleared in <90 minutes



Potential Secondary Incidents

The estimated number of crash incidents which could be secondary to other crash or disable vehicle incidents.





Work Zones

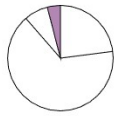
VDOT measures the number and types of work events and the impact on non-recurring congestion. The allowable work hours are regularly reviewed to promote safety and reduce congestion.

Work Zones by Interstate

Work zone event data from VaTraffic

	Number of Lane Impacting Work Zones		Miles-Hours of Lane Impacting Work Zones	
	2021	2022	2021	2022
I-64	612	452	10,612	13,035
I-85	205	480	3,577	9,849
I-95	602	1,399	6,798	40,962
I-195	214	331	1,695	2,763
I-295	832	901	9,993	31,182
Grand Total	2,465	3,563	32,675	97,792

Work event types include: new roadway construction; road widening; resurfacing; paving; bridge replacement; bridge joint, approach, deck, and superstructure repairs; bridge inspections; pavement marking installation; ITS equipment repair and installation; tunnel cleaning; and overhead sign structure repairs. Long-term work zones (>7 days) were not included.



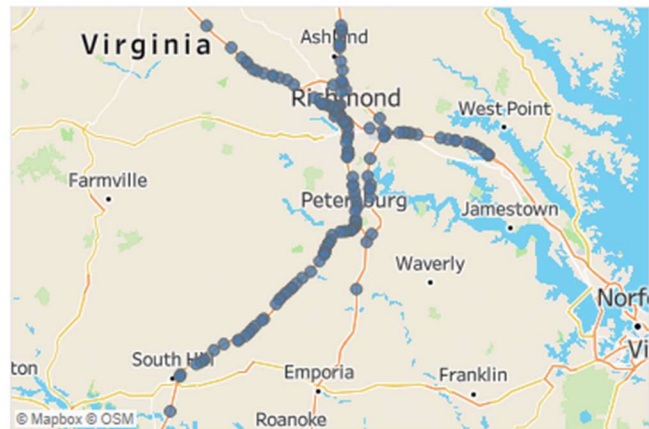
Weather

VDOT measures the number and types of weather events and the impact on non-recurring congestion. The data helps identify emerging maintenance trends.

Weather Type		2021	2022
Fog			2
High Wind			1
Icy Conditions		4	13
Other		245	111
Standing Water (P..		34	57

Weather	Road Condition	2021	2022
Snow/Ice	Minor	8,602	25,906
	Moderate	5,342	2,871
	Severe		1,413

Short Term Weather Events 2022





Operations Assets

Cameras, Signs, and Safety Service Patrols are among the tools used to manage and minimize traffic congestion due to both recurring and non-recurring causes. VDOT measures the coverage areas and condition of these assets that help monitor traffic and improve mobility.

ITS Assets Availability - CRO, 2022

Device Type	Number of Devices	% of Time Devices were Online
CCTV	87	99.1%
CCTV Portable	1	90.4%
CMS	15	99.0%
CMS Portable	19	99.6%

Safety Service Patrol Coverage

Coverage as of December 31, 2022



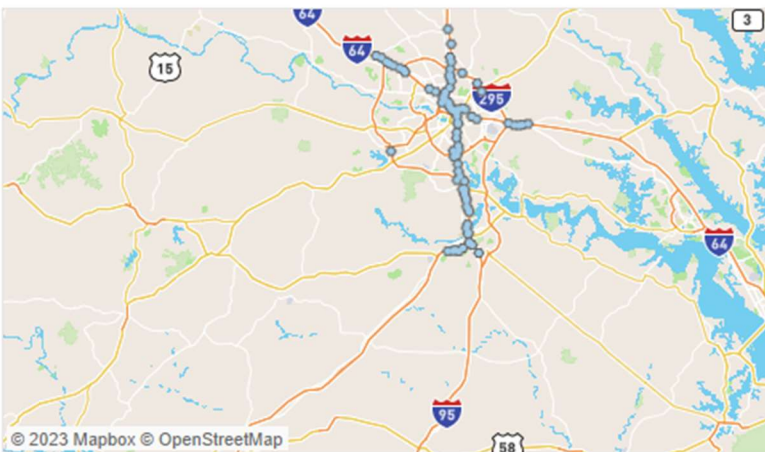
Interstate	Miles Covered	% Miles Covered	Mile-Hours Covered/Week	% Mile-Hours/Week
I-64	32	46%	4,872	42%
I-85	0	0%	0	0%
I-95	40	62%	6,346	58%
I-195	4	100%	448	67%
I-295	15	28%	1,680	19%
Grand T..	91	35%	13,346	31%

SSP Coverage Legend (Hours Per Day/Days Per Week)

- 14/5
- 14/5 & 16/2
- 16/7
- 24/7
- No SSP

Camera Coverage

Cameras (CCTV) as of December 31, 2022



Interstate	Directional Miles of Camera Coverage	Estimated % Miles Covered by CCTV
I-64	42	30%
I-85	14	10%
I-95	60	46%
I-195	0	0%
I-295	7	7%
Grand Total	123	24%

Coverage assumes that cameras can only see one side of the interstate unless it is in the median. 1 mile upstream and downstream is assumed to be covered by each camera.

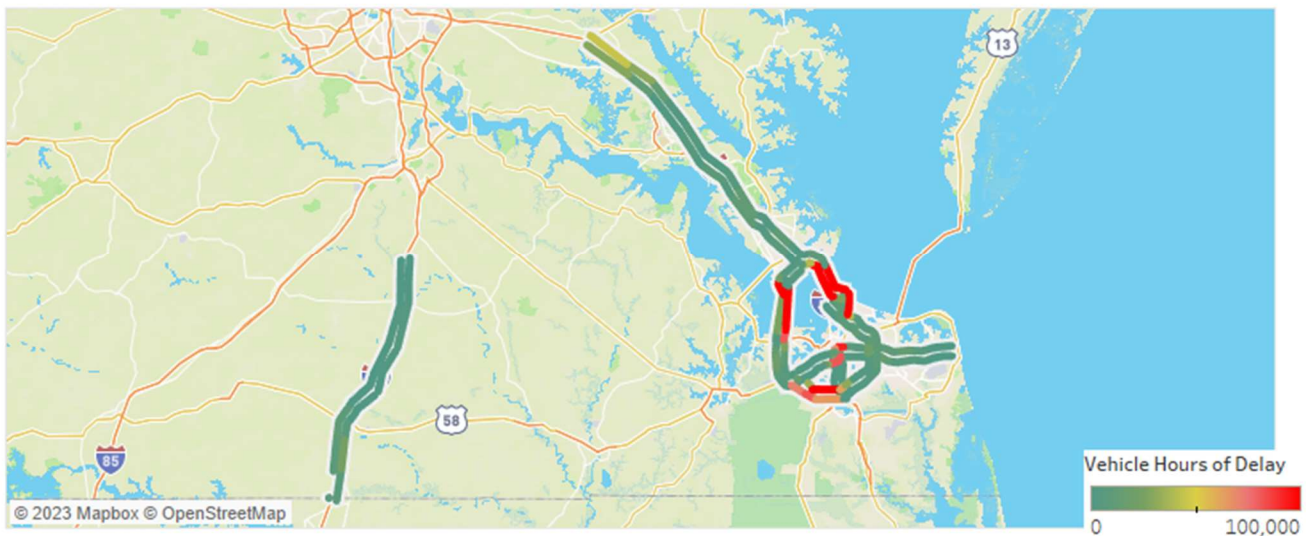


Hampton Roads District

This report compares performance of Interstate Highways from 2021 to 2022

Measure		Target	2021	2022
Total Vehicle Hours of Delay on Interstates The additional hours travelers waited in traffic that is moving 20 mph less than free-flow speed		↘	3,747K	4,087K
ALL INCIDENTS	All Reported Incidents Number of disabled vehicle and crash incidents	N/A	15,442	32,304
	All Reported Incidents Number of disabled vehicle and crash incidents	N/A	13,486	30,799
	Scene Clearance Time Median time from verifying the incident to opening all lanes and shoulders	↘	21	15
	Potential Secondary Crash Incidents Estimated # of crash incidents which could be secondary to other incidents	↘	13,497	30,871
LANE IMPACTING INCIDENTS	Lane Impacting Incidents # of disabled vehicle and crash incidents that block at least one travel lane	N/A	8,593	8,595
	Lane Impacting Incidents # of disabled vehicle and crash incidents that block at least one travel lane	N/A	7,549	7,628
	Roadway Clearance Time Median time from verifying the incident to opening all travel lanes to traffic	↘	19	22
	Lane Impacting Incidents Cleared in < 30 minutes Percentage of Lane Impacting Incidents that are cleared in less than 30 min	59%	62%	58%
	Lane Impacting Incidents Cleared in < 90 minutes Percentage of Lane Impacting Incidents that are cleared in less than 90 min	94%	94%	93%

Congestion in 2022

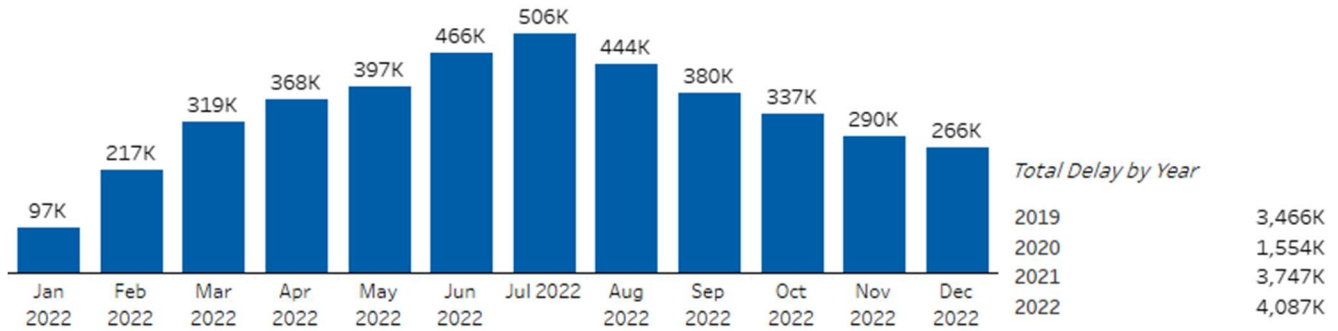




Congestion Overview

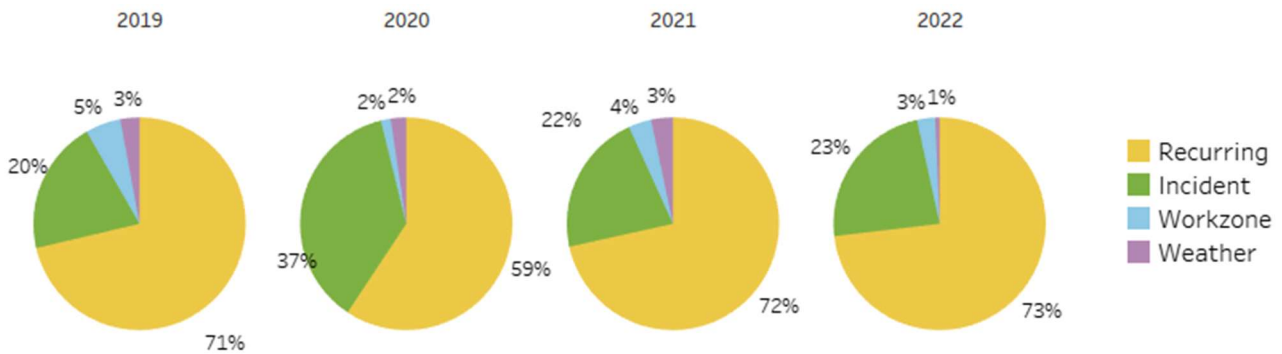
Vehicle Hours of Delay

Total Delay is calculated using INRIX probe speed data and historical VDOT volumes. Delay is calculated when the observed speed is 20 mph or more below free flow conditions.

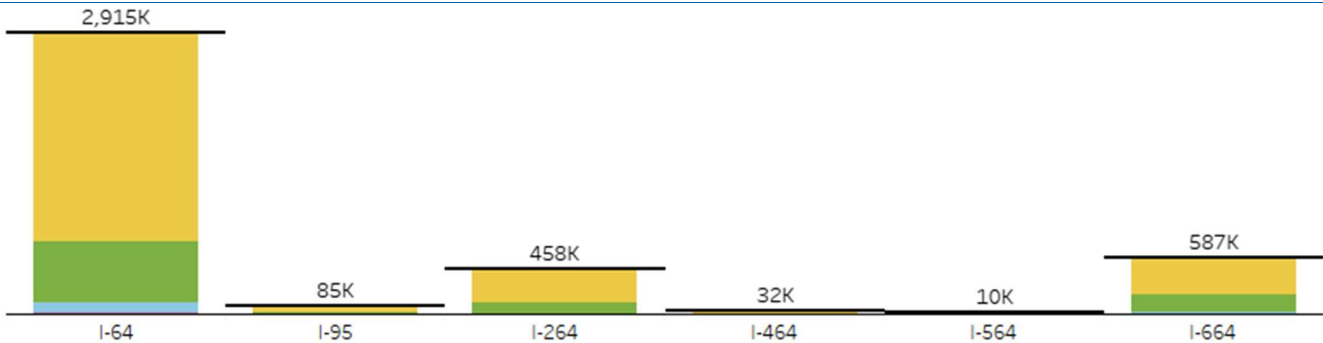


Causes of Congestion

Congestion can be broken down into recurring and non-recurring sources. Recurring congestion is caused by bottlenecks due to high volume or geometric constraints. Sources of non-recurring congestion on interstates include incidents, work zones, and weather events. The amount of congestion due to each of these sources can be estimated at a planning level as shown below.



Delay by Cause & Interstate in 2022





Incidents

Traffic incidents includes both crashes and disabled vehicles and are a frequent cause of non-recurring congestion. Quick clearance programs such as Safety Service Patrols, incident management coordination, and after-action review with the Virginia State Police (VSP) and the other first responders can influence the effects of incidents on traffic.

Total Incidents & Incident Clearance Time

Incident Clearance Time (also called Scene Clearance Time) is measured for all crash and disabled vehicle incidents on travel lanes and shoulders. Median Incident Clearance Time is shorter than Median Roadway Clearance Time because it is measured for all incidents, not just those which are lane impacting. A simple incident on a shoulder, such as a vehicle with a flat tire, is often quick to clear. Some Data in October 2022 was permanently lost.

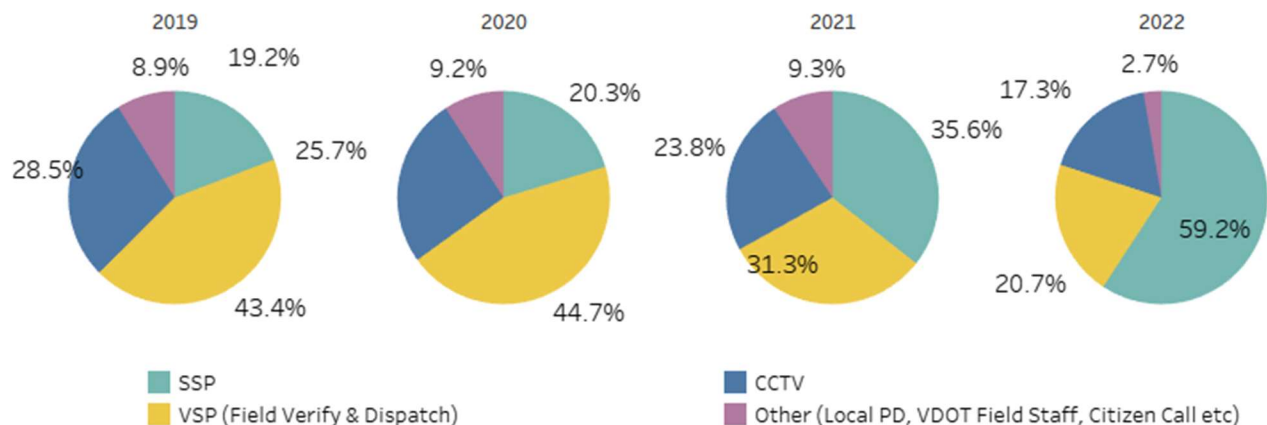


Safety Service Patrol Incident Responses & Response Time

Safety Service Patrol (SSP) Response Time is measured in minutes from the time the SSP Operator was notified to the time they arrived on Scene. This is measured for all disabled vehicle and crash incidents, which an SSP responded to. (Average Response Time between 2 and 60 minutes is measured)



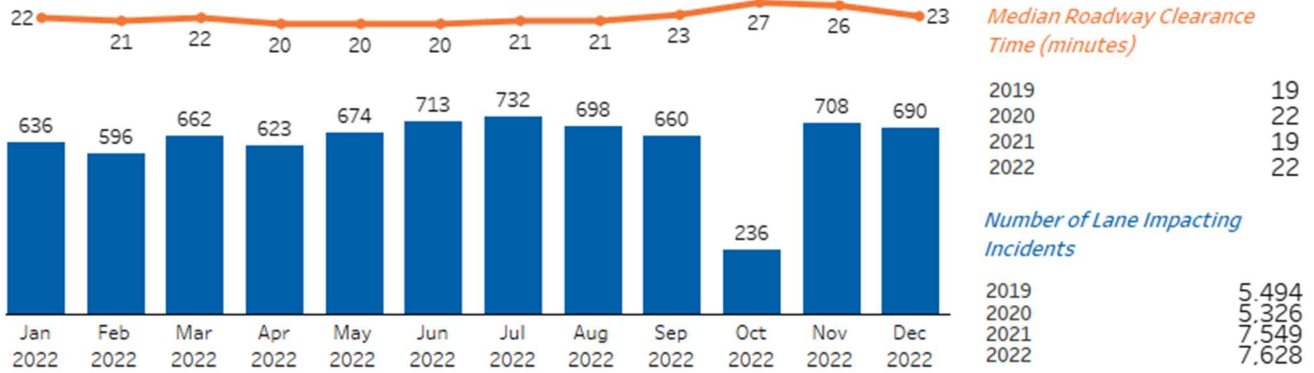
All Incidents by Detection Source





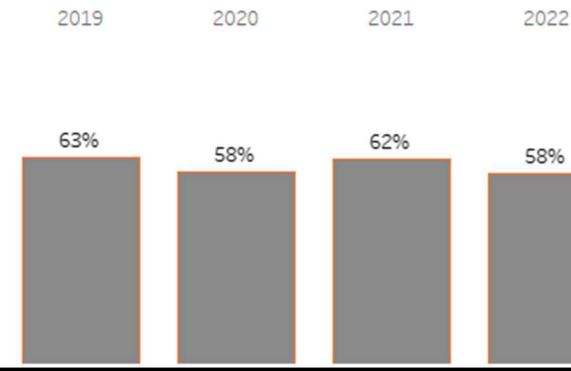
Lane Impacting Incidents & Roadway Clearance Time

Roadway Clearance Time (RCT) is measured for all disabled vehicle and crash incidents that block at least one travel lane during the course of the incident. RCT is measured from the start of the incident to when all travel lanes are clear and open to traffic.

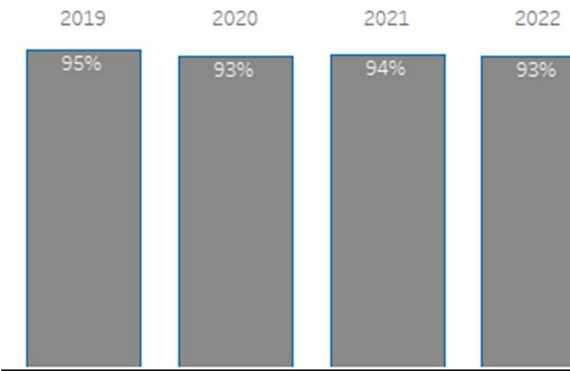


Lane Impacting Incidents by Roadway Clearance Time

Lane Impacting Incidents Cleared in <30 minutes

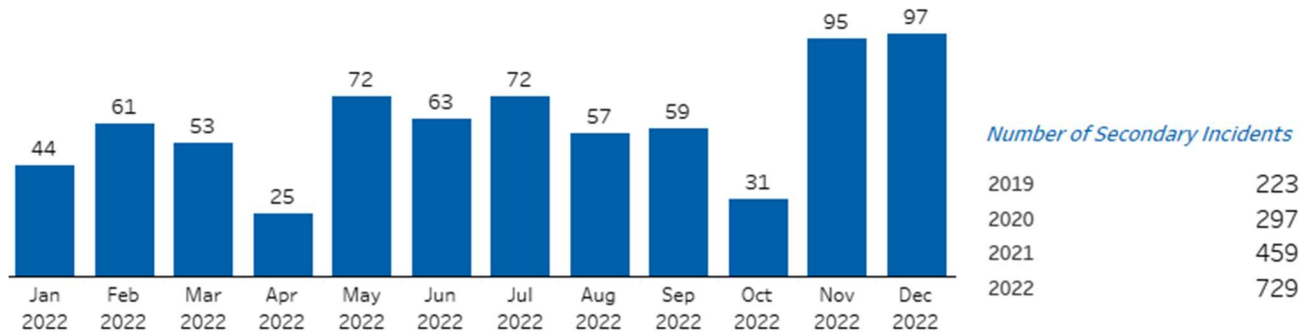


Lane Impacting Incidents Cleared in <90 minutes



Potential Secondary Incidents

The estimated number of crash incidents which could be secondary to other crash or disable vehicle incidents.





Work Zones

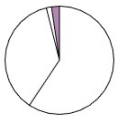
VDOT measures the number and types of work events and the impact on non-recurring congestion. The allowable work hours are regularly reviewed to promote safety and reduce congestion.

Work Zones by Interstate

Work zone event data from VaTraffic

	Number of Lane Impacting Work Zones		Miles-Hours of Lane Impacting Work Zones	
	2021	2022	2021	2022
I-64	861	1,397	25,765	22,296
I-95	242	97	9,633	7,941
I-264	158	215	1,694	5,584
I-464	46	23	446	140
I-564	27	20	291	201
I-664	225	264	3,172	4,521
Grand Total	1,559	2,016	41,000	40,683

Work event types include: new roadway construction; road widening; resurfacing; paving; bridge replacement; bridge joint, approach, deck, and superstructure repairs; bridge inspections; pavement marking installation; ITS equipment repair and installation; tunnel cleaning; and overhead sign structure repairs. Long-term work zones (>7 days) were not included.



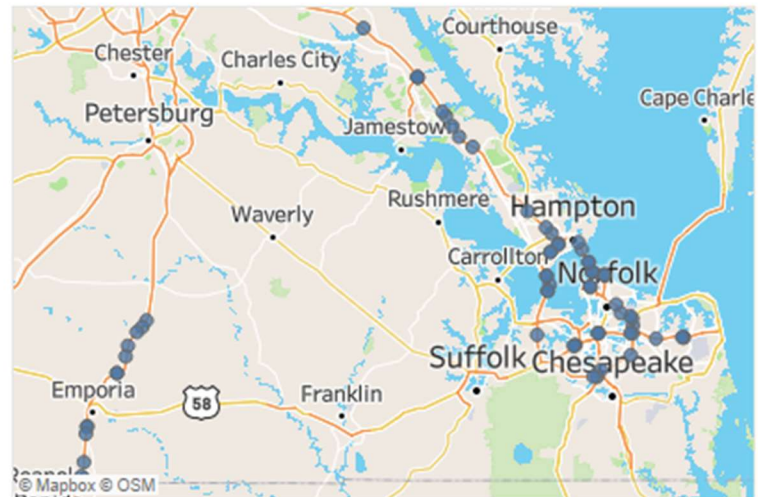
Weather

VDOT measures the number and types of weather events and the impact on non-recurring congestion. The data helps identify emerging maintenance trends.

Weather Type	2021	2022
Fog	78	75
High Wind	46	49
Icy Conditions	4	18
Other	14	23
Standing Water (P..	8	21

Weather	Road Condition	2021	2022
Snow/Ice	Minor	635	20,827
	Moderate	19	515
	Closed	2	

Short Term Weather Events 2022





Operations Assets

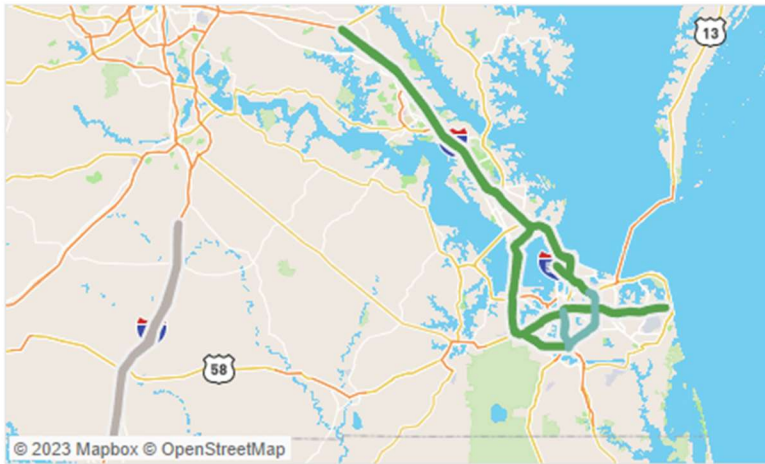
Cameras, Signs, and Safety Service Patrols are among the tools used to manage and minimize traffic congestion due to both recurring and non-recurring causes. VDOT measures the coverage areas and condition of these assets that help monitor traffic and improve mobility.

ITS Assets Availability - ERO, 2022

Device Type	Number of Devices	% of Time Devices were Online
CCTV	293	92.2%
CCTV Portable	1	100.0%
CMS	201	90.4%
CMS Portable	6	100.0%

Safety Service Patrol Coverage

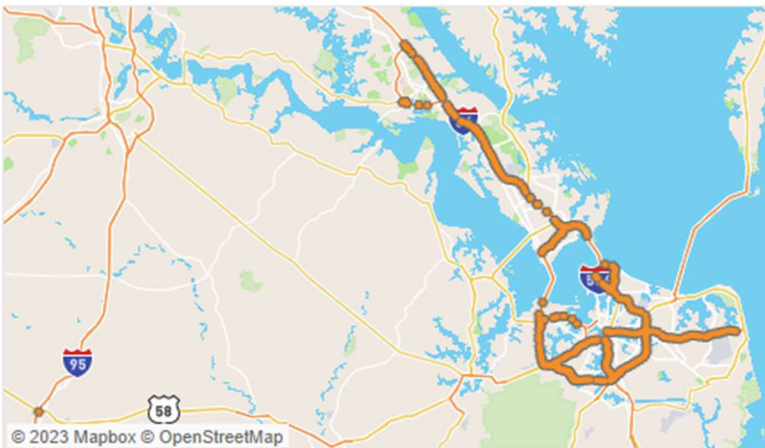
Coverage as of December 31, 2022



Interstate	Miles Covered	% Miles Covered	Mile-Hours Covered / Week	% Mile-Hours / Week
I-64	79	100%	13,272	100%
I-95	0	0%	0	0%
I-264	22	88%	4,200	100%
I-464	6	100%	1,008	100%
I-564	3	100%	504	100%
I-664	21	100%	3,528	100%
Grand T..	131	78%	22,512	80%

Camera Coverage

Cameras (CCTV) as of December 31, 2022



Interstate	Directional Miles of Camera Coverage	Estimated % Miles Covered by CCTV
I-64	111	70%
I-95	2	3%
I-264	45	90%
I-464	10	84%
I-564	4	73%
I-664	28	67%
Grand Total	200	60%

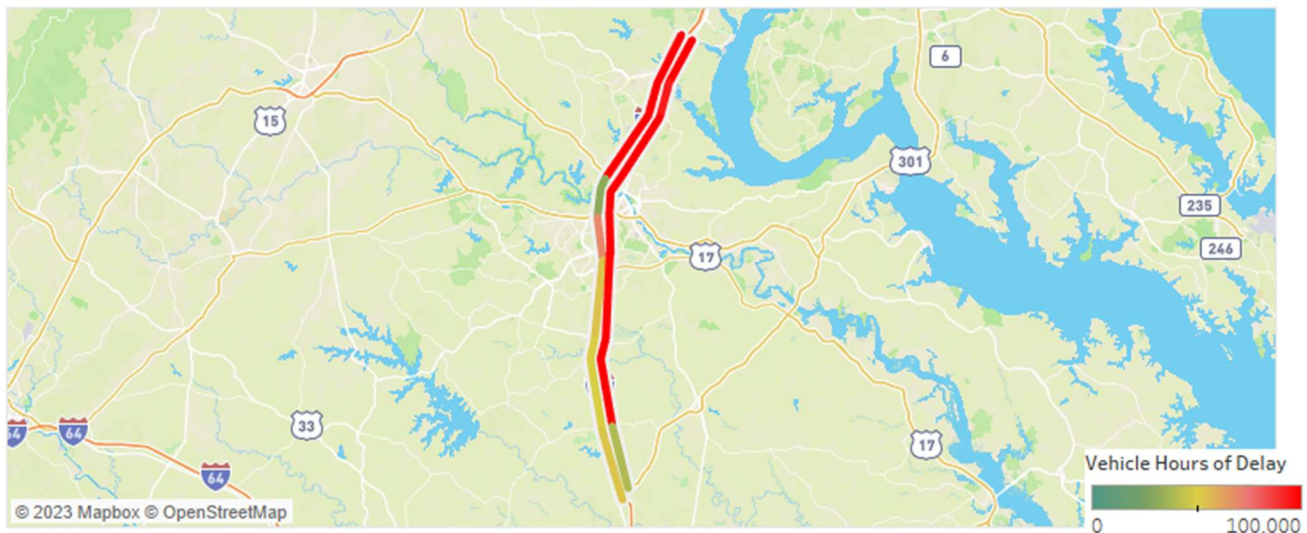


Fredericksburg District

This report compares performance of Interstate Highways from 2020 to 2021

Measure		Target	2021	2022
Total Vehicle Hours of Delay on Interstates The additional hours travelers waited in traffic that is moving 20 mph less than free-flow speed		↘	3,302K	3,148K
ALL INCIDENTS	All Reported Incidents Number of disabled vehicle and crash incidents	N/A	8,833	8,275
	All Reported Incidents Number of disabled vehicle and crash incidents	N/A	6,751	6,442
	Scene Clearance Time Median time from verifying the incident to opening all lanes and shoulders	↘	26	30
	Potential Secondary Crash Incidents Estimated # of crash incidents which could be secondary to other incidents	↘	6,756	6,455
LANE IMPACTING INCIDENTS	Lane Impacting Incidents # of disabled vehicle and crash incidents that block at least one travel lane	N/A	2,060	1,652
	Lane Impacting Incidents # of disabled vehicle and crash incidents that block at least one travel lane	N/A	951	763
	Roadway Clearance Time Median time from verifying the incident to opening all travel lanes to traffic	↘	39	45
	Lane Impacting Incidents Cleared in < 30 minutes Percentage of Lane Impacting Incidents that are cleared in less than 30 min	45%	40%	35%
	Lane Impacting Incidents Cleared in < 90 minutes Percentage of Lane Impacting Incidents that are cleared in less than 90 min	86%	87%	85%

Congestion in 2022

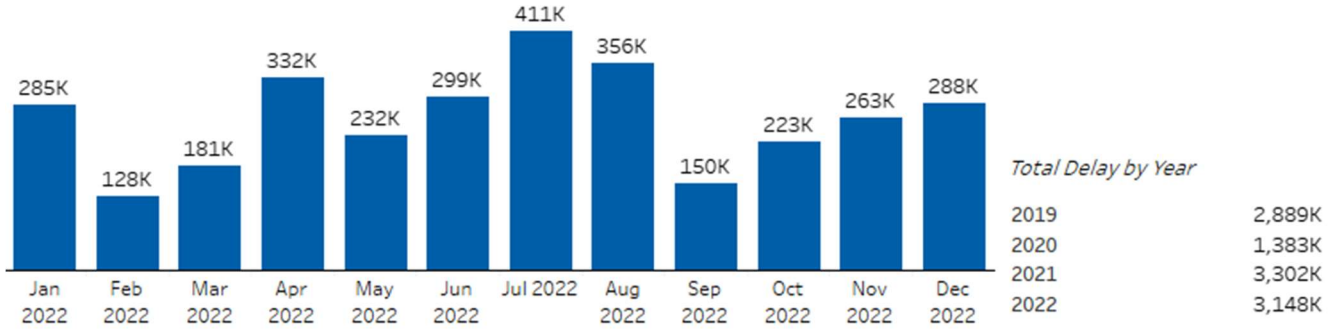




Congestion Overview

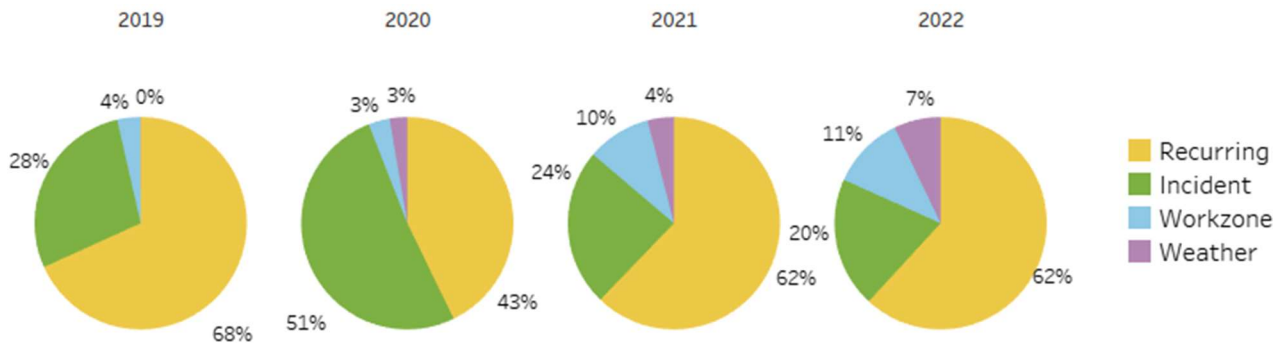
Vehicle Hours of Delay

Total Delay is calculated using INRIX probe speed data and historical VDOT volumes. Delay is calculated when the observed speed is 20 mph or more below free flow conditions.

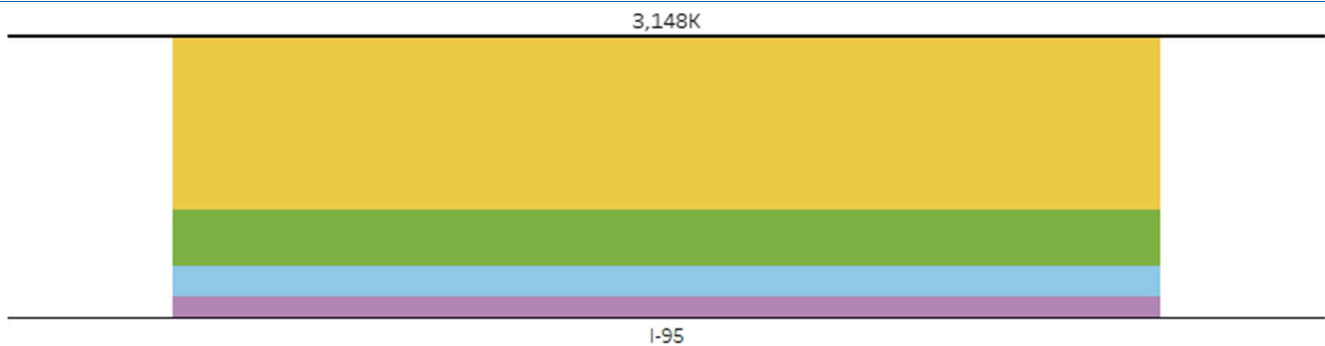


Causes of Congestion

Congestion can be broken down into recurring and non-recurring sources. Recurring congestion is caused by bottlenecks due to high volume or geometric constraints. Sources of non-recurring congestion on interstates include incidents, work zones, and weather events. The amount of congestion due to each of these sources can be estimated at a planning level as shown below.



Delay by Cause & Interstate in 2022



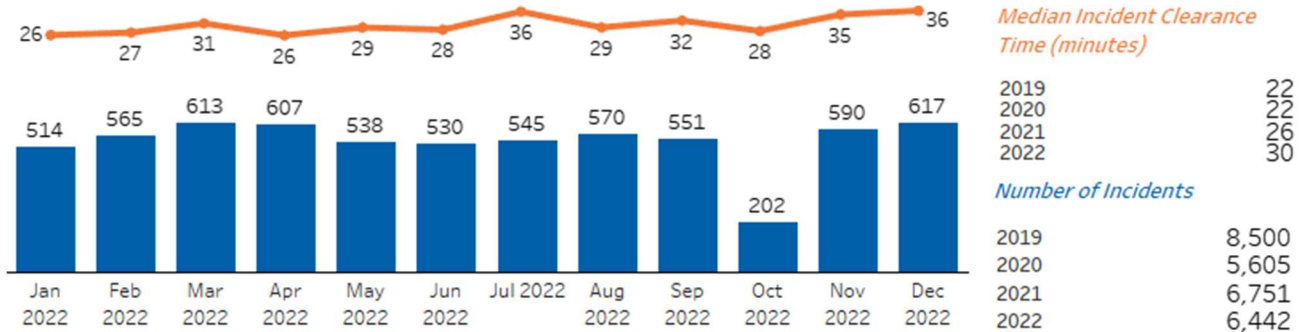


Incidents

Traffic incidents includes both crashes and disabled vehicles and are a frequent cause of non-recurring congestion. Quick clearance programs such as Safety Service Patrols, incident management coordination, and after-action review with the Virginia State Police (VSP) and the other first responders can influence the effects of incidents on traffic.

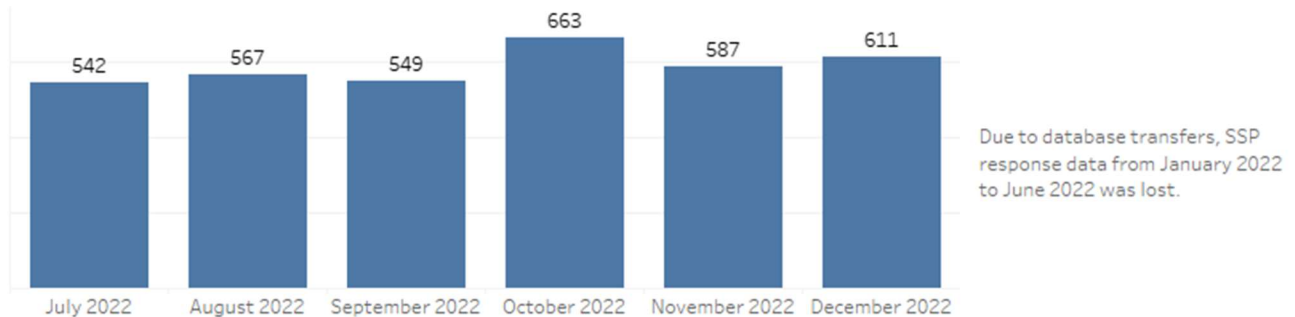
Total Incidents & Incident Clearance Time

Incident Clearance Time (also called Scene Clearance Time) is measured for all crash and disabled vehicle incidents on travel lanes and shoulders. Median Incident Clearance Time is shorter than Median Roadway Clearance Time because it is measured for all incidents, not just those which are lane impacting. A simple incident on a shoulder, such as a vehicle with a flat tire, is often quick to clear. Some Data in October 2022 was permanently lost.

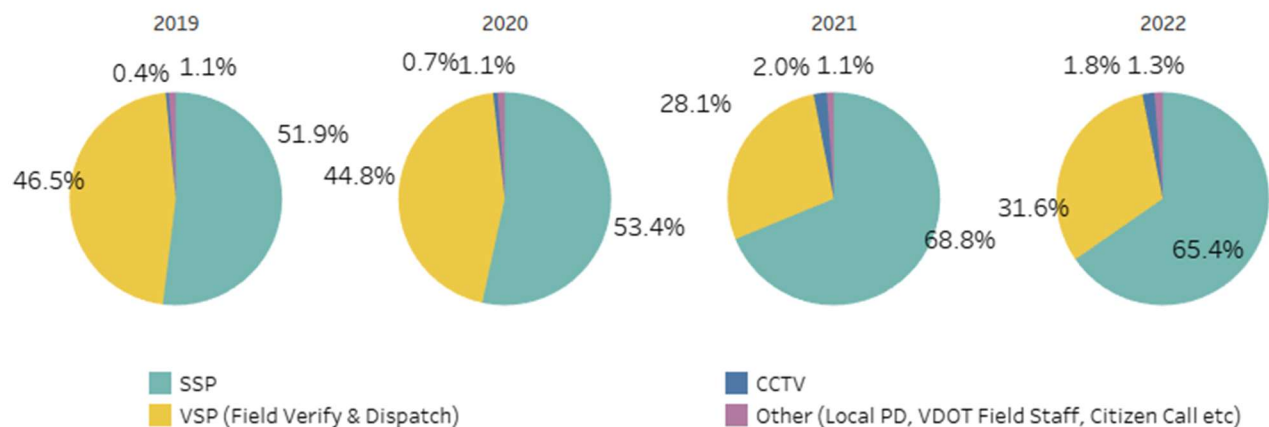


Safety Service Patrol Incident Responses & Response Time

Safety Service Patrol (SSP) Response Time is measured in minutes from the time the SSP Operator was notified to the time they arrived on Scene. This is measured for all disabled vehicle and crash incidents, which an SSP responded to. (Average Response Time between 2 and 60 minutes is measured)



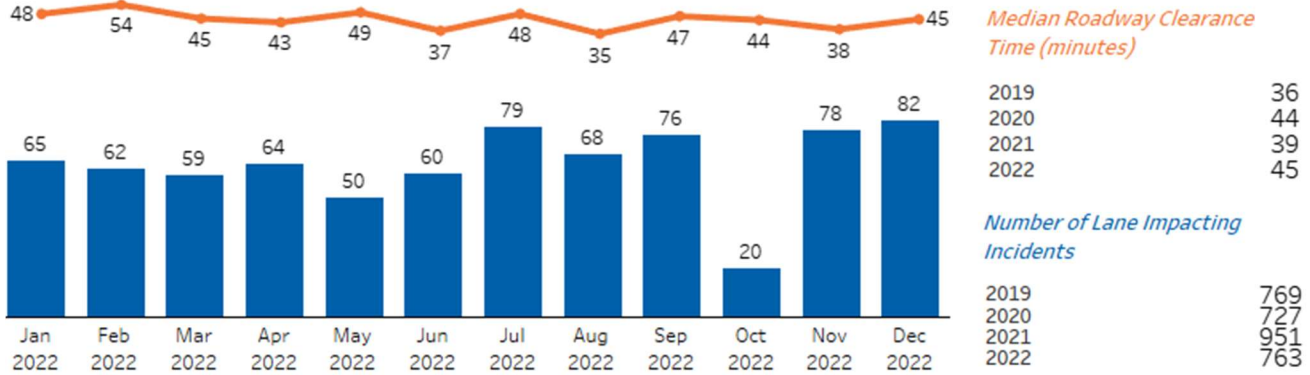
All Incidents by Detection Source





Lane Impacting Incidents & Roadway Clearance Time

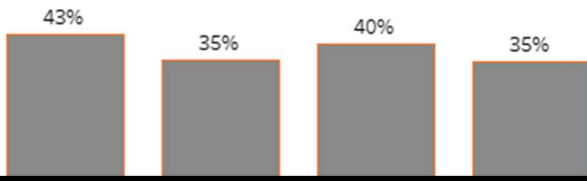
Roadway Clearance Time (RCT) is measured for all disabled vehicle and crash incidents that block at least one travel lane during the course of the incident. RCT is measured from the start of the incident to when all travel lanes are clear and open to traffic.



Lane Impacting Incidents by Roadway Clearance Time

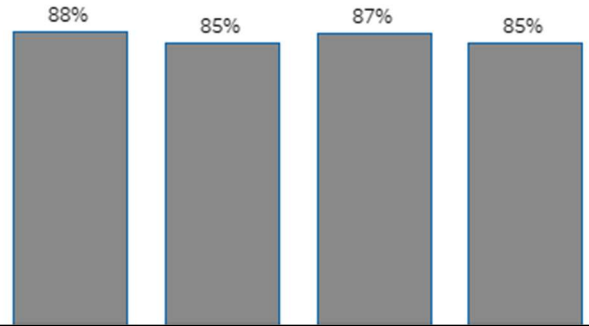
Lane Impacting Incidents Cleared in <30 minutes

2019 2020 2021 2022



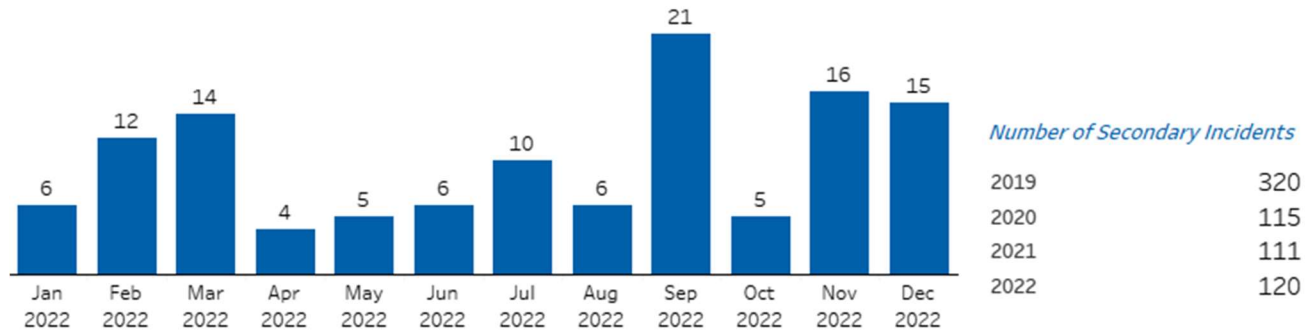
Lane Impacting Incidents Cleared in <90 minutes

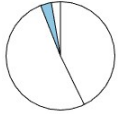
2019 2020 2021 2022



Potential Secondary Incidents

The estimated number of crash incidents which could be secondary to other crash or disable vehicle incidents.





Work Zones

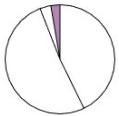
VDOT measures the number and types of work events and the impact on non-recurring congestion. The allowable work hours are regularly reviewed to promote safety and reduce congestion.

Work Zones by Interstate

Work zone event data from VaTraffic

	Number of Lane Impacting Work Zones		Miles-Hours of Lane Impacting Work Zones	
	2021	2022	2021	2022
I-95	1,284	1,800	25,517	29,265
Grand Total	1,284	1,800	25,517	29,265

Work event types include: new roadway construction; road widening; resurfacing; paving; bridge replacement; bridge joint, approach, deck, and superstructure repairs; bridge inspections; pavement marking installation; ITS equipment repair and installation; tunnel cleaning; and overhead sign structure repairs. Long-term work zones (>7 days) were not included.

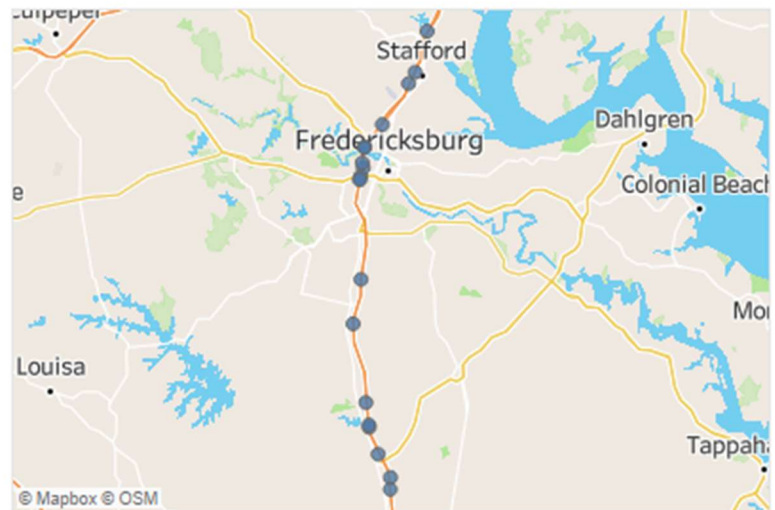


Weather

VDOT measures the number and types of weather events and the impact on non-recurring congestion. The data helps identify emerging maintenance trends.

Weather Type		2021	2022
Icy Conditions		1	2
Other		13	12
Standing Water (Ponding)		4	5
Weather	Road Condition	2021	2022
Snow/Ice	Minor	1,904	2,553
	Moderate	722	1,873
	Severe		2,342

Short Term Weather Events 2022





Operations Assets

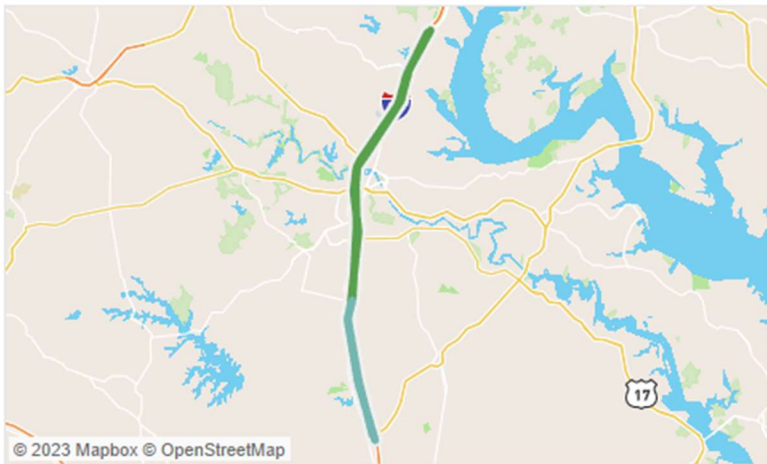
Cameras, Signs, and Safety Service Patrols are among the tools used to manage and minimize traffic congestion due to both recurring and non-recurring causes. VDOT measures the coverage areas and condition of these assets that help monitor traffic and improve mobility.

ITS Assets Availability - CRO, 2022

Device Type	Number of Devices	% of Time Devices were Online
CCTV	87	99.1%
CCTV Portable	1	90.4%
CMS	15	99.0%
CMS Portable	19	99.6%

Safety Service Patrol Coverage

Coverage as of December 31, 2022



Interstate	Miles Covered	% Miles Covered	Mile-Hours Covered/Week	% Mile-Hours/Week
I-95	50	100%	7,280	87%
Grand Total	50	100%	7,280	87%

Camera Coverage

Cameras (CCTV) as of December 31, 2022



Interstate	Directional Miles of Camera Coverage	Estimated % Miles Covered by CCTV
I-95	34	34%
Grand Total	34	34%

Coverage assumes that cameras can only see one side of the interstate unless it is in the median. 1 mile upstream and downstream is assumed to be covered by each camera.

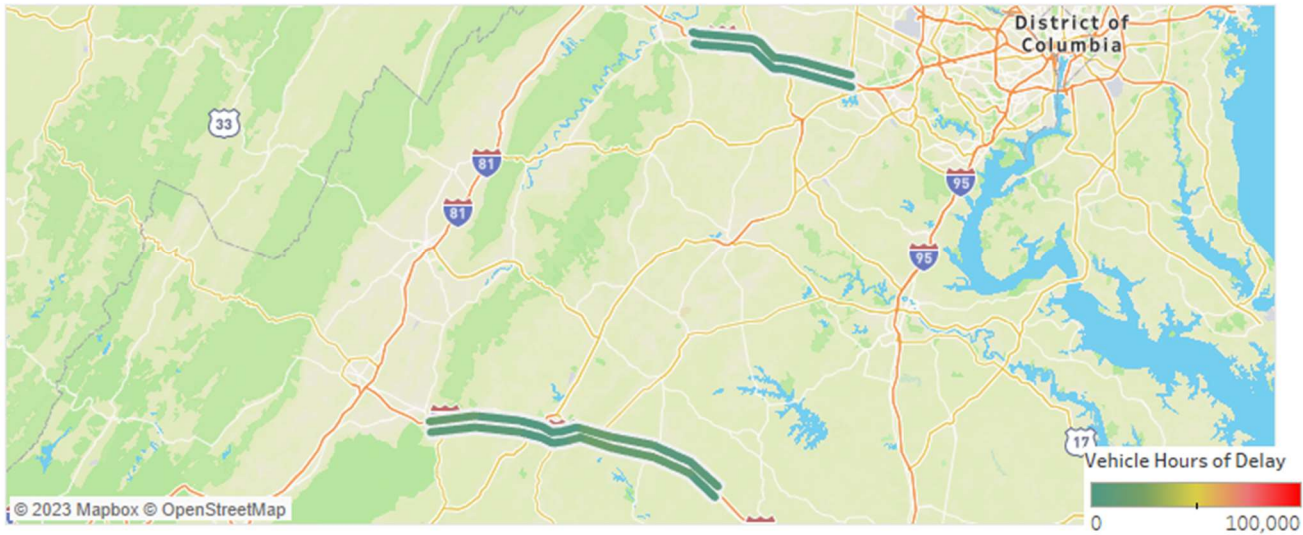


Culpeper District

This report compares performance of Interstate Highways from 2021 to 2022

Measure		Target	2021	2022	
Total Vehicle Hours of Delay on Interstates The additional hours travelers waited in traffic that is moving 20 mph less than free-flow speed		↘	82K	188K	
ALL INCIDENTS	All Roads All Reported Incidents Number of disabled vehicle and crash incidents	N/A	4,483	3,894	
	Interstates	All Reported Incidents Number of disabled vehicle and crash incidents	N/A	3,249	2,978
		Scene Clearance Time Median time from verifying the incident to opening all lanes and shoulders	↘	10	11
		Potential Secondary Crash Incidents Estimated # of crash incidents which could be secondary to other incidents	↘	3,252	2,981
LANE IMPACTING INCIDENTS	All Roads Lane Impacting Incidents # of disabled vehicle and crash incidents that block at least one travel lane	N/A	1,378	1,176	
	Interstates	Lane Impacting Incidents # of disabled vehicle and crash incidents that block at least one travel lane	N/A	374	381
		Roadway Clearance Time Median time from verifying the incident to opening all travel lanes to traffic	↘	40	40
		Lane Impacting Incidents Cleared in < 30 minutes Percentage of Lane Impacting Incidents that are cleared in less than 30 min	31%	37%	37%
		Lane Impacting Incidents Cleared in < 90 minutes Percentage of Lane Impacting Incidents that are cleared in less than 90 min	87%	89%	87%

Congestion in 2022

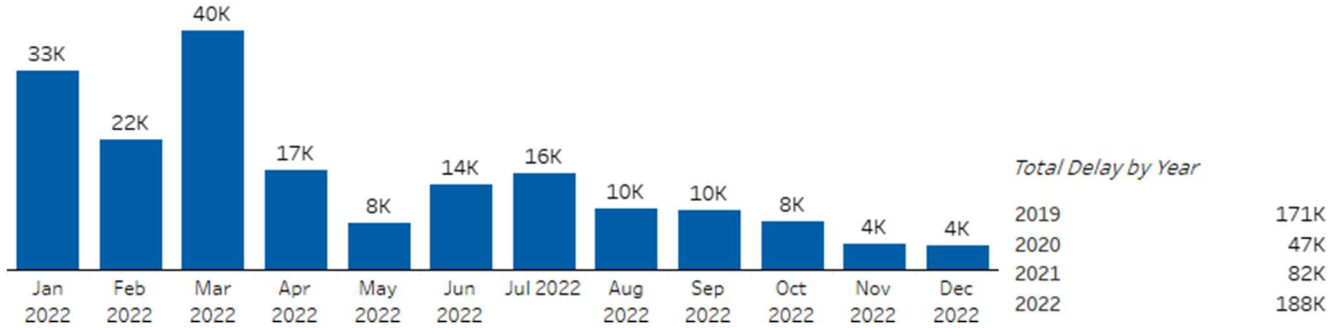




Congestion Overview

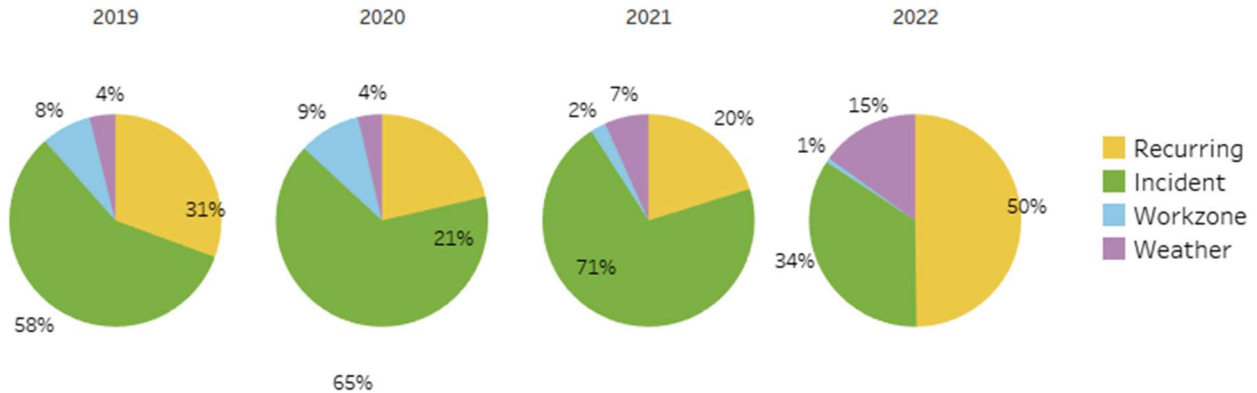
Vehicle Hours of Delay

Total Delay is calculated using INRIX probe speed data and historical VDOT volumes. Delay is calculated when the observed speed is 20 mph or more below free flow conditions.

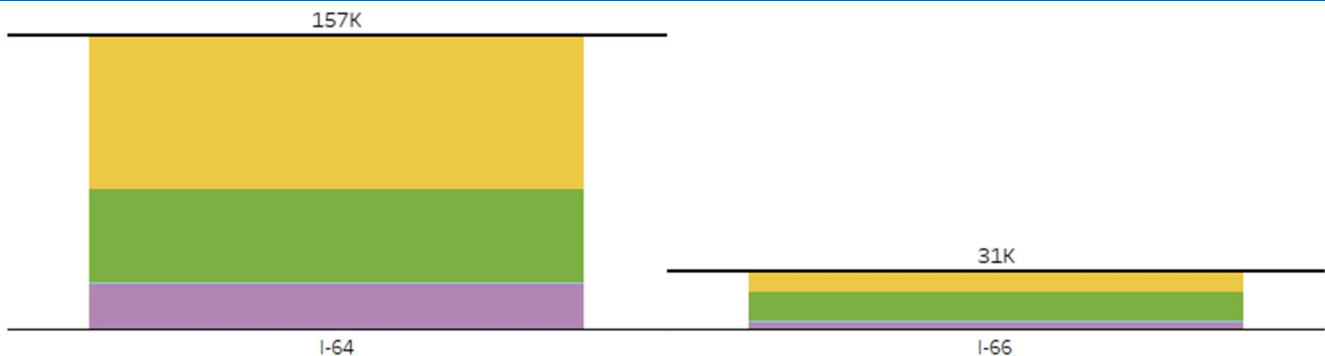


Causes of Congestion

Congestion can be broken down into recurring and non-recurring sources. Recurring congestion is caused by bottlenecks due to high volume or geometric constraints. Sources of non-recurring congestion on interstates includes incidents, work zones, and weather events. The amount of congestion due to each of these sources can be estimated at a planning level as shown below.



Delay by Cause & Interstate in 2022



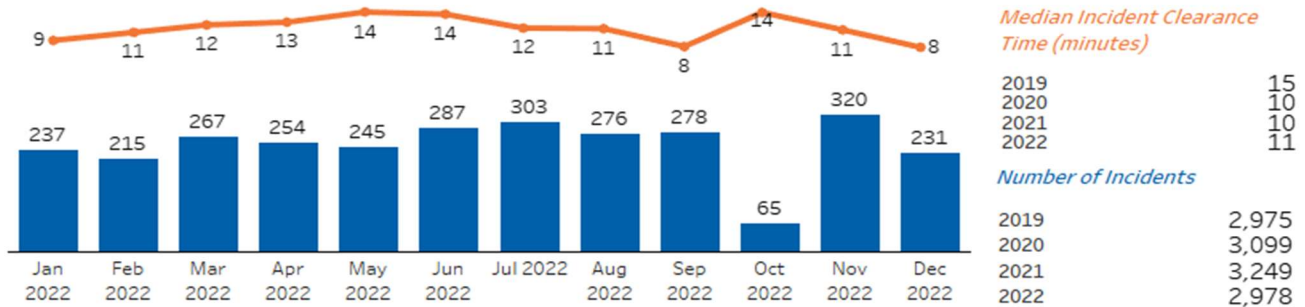


Incidents

Traffic incidents includes both crashes and disabled vehicles and are a frequent cause of non-recurring congestion. Quick clearance programs such as Safety Service Patrols, incident management coordination, and after-action review with the Virginia State Police (VSP) and the other first responders can influence the effects of incidents on traffic.

Total Incidents & Incident Clearance Time

Incident Clearance Time (also called Scene Clearance Time) is measured for all crash and disabled vehicle incidents on travel lanes and shoulders. Median Incident Clearance Time is shorter than Median Roadway Clearance Time because it is measured for all incidents, not just those which are lane impacting. A simple incident on a shoulder, such as a vehicle with a flat tire, is often quick to clear. Some Data in October 2022 was permanently lost.

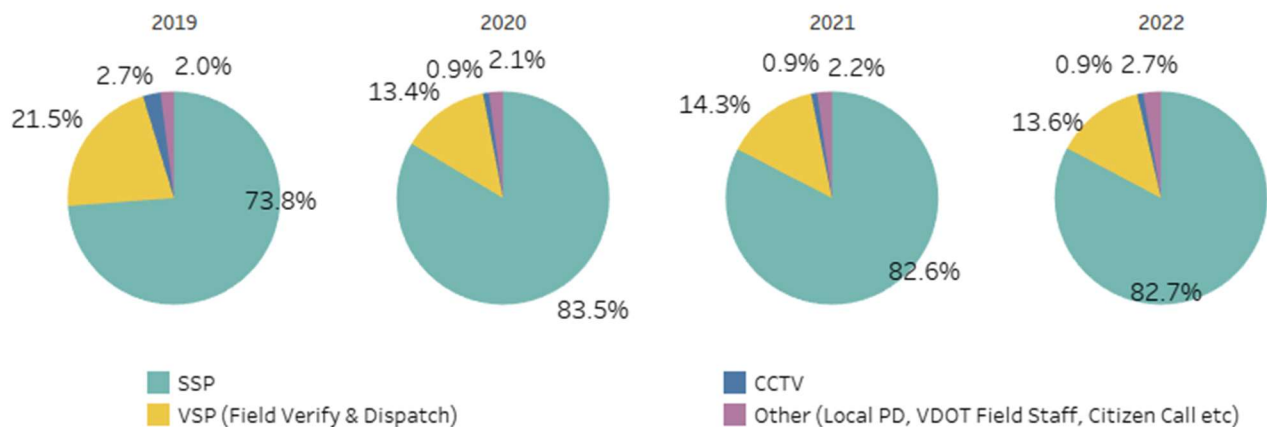


Safety Service Patrol Incident Responses & Response Time

Safety Service Patrol (SSP) Response Time is measured in minutes from the time the SSP Operator was notified to the time they arrived on Scene. This is measured for all disabled vehicle and crash incidents, which an SSP responded to. (Average Response Time between 2 and 60 minutes is measured)



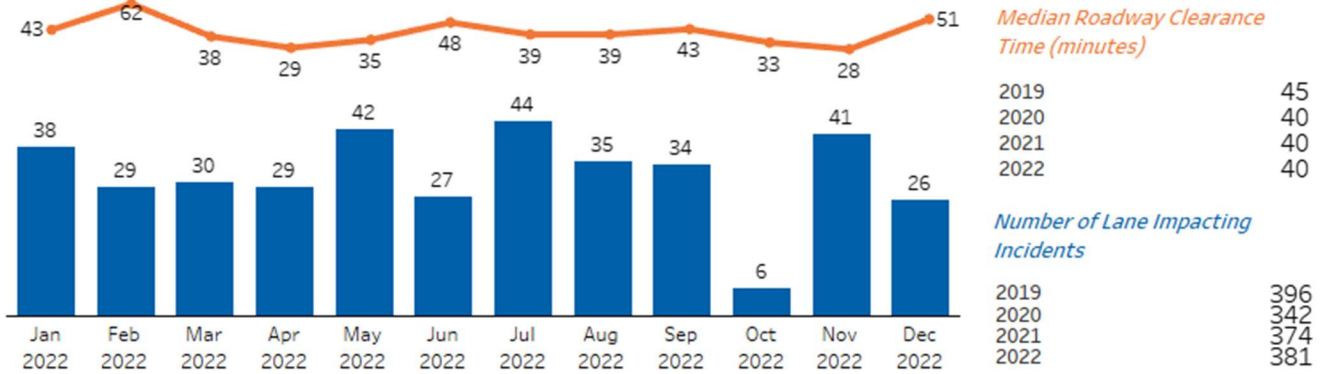
All Incidents by Detection Source





Lane Impacting Incidents & Roadway Clearance Time

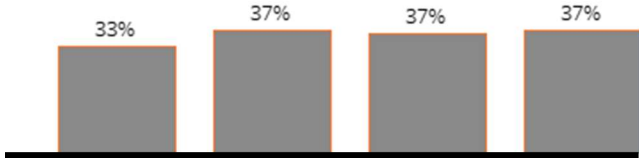
Roadway Clearance Time (RCT) is measured for all disabled vehicle and crash incidents that block at least one travel lane during the course of the incident. RCT is measured from the start of the incident to when all travel lanes are clear and open to traffic.



Lane Impacting Incidents by Roadway Clearance Time

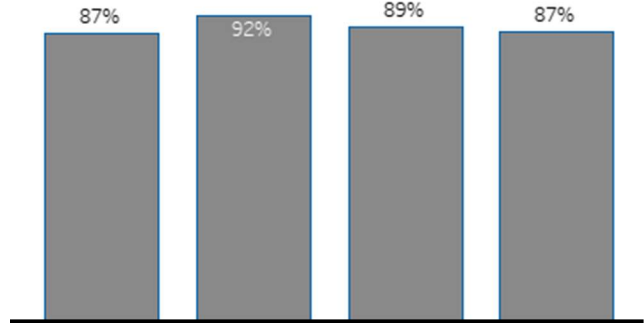
Lane Impacting Incidents Cleared in <30 minutes

2019 2020 2021 2022



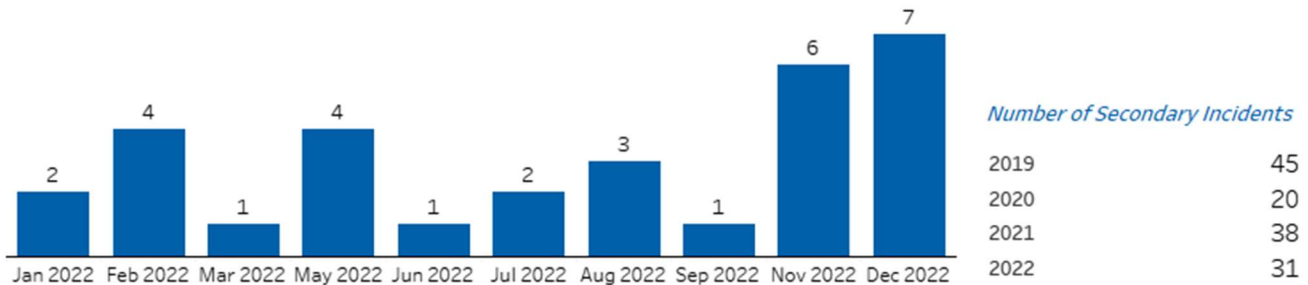
Lane Impacting Incidents Cleared in <90 minutes

2019 2020 2021 2022



Potential Secondary Incidents

The estimated number of crash incidents which could be secondary to other crash or disable vehicle incidents.





Work Zones

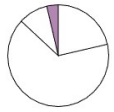
VDOT measures the number and types of work events and the impact on non-recurring congestion. The allowable work hours are regularly reviewed to promote safety and reduce congestion.

Work Zones by Interstate

Work zone event data from VaTraffic

	Number of Lane Impacting Work Zones		Miles-Hours of Lane Impacting Work Zones	
	2021	2022	2021	2022
I-64	356	321	15,469	12,778
I-66	99	81	2,655	1,786
Grand Total	455	402	18,124	14,564

Work event types include: new roadway construction; road widening; resurfacing; paving; bridge replacement; bridge joint, approach, deck, and superstructure repairs; bridge inspections; pavement marking installation; ITS equipment repair and installation; tunnel cleaning; and overhead sign structure repairs. Long-term work zones (>7 days) were not included.

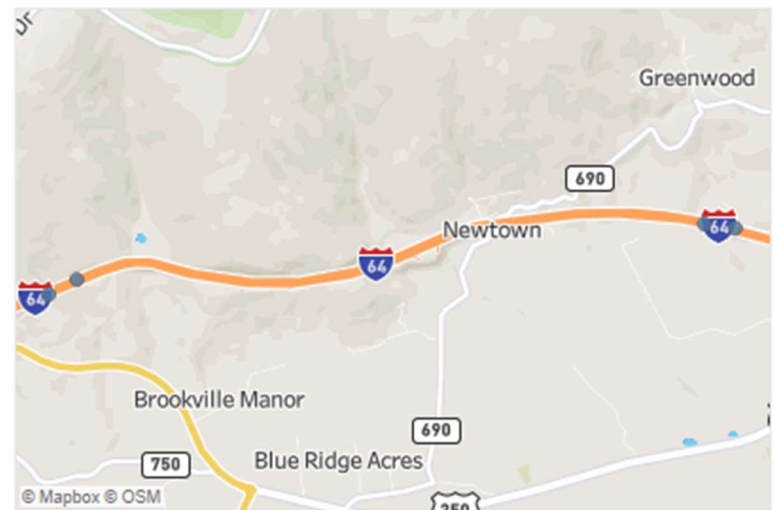


Weather

VDOT measures the number and types of weather events and the impact on non-recurring congestion. The data helps identify emerging maintenance trends.

Weather Type		2021	2022
Fog		1	2
High Wind			2
Weather	Road Condition	2021	2022
Snow/Ice	Minor	4,419	3,365
	Moderate	2,559	5,397
	Severe	37	14
	Closed		109

Short Term Weather Events 2022





Operations Assets

Cameras, Signs, and Safety Service Patrols are among the tools used to manage and minimize traffic congestion due to both recurring and non-recurring causes. VDOT measures the coverage areas and condition of these assets that help monitor traffic and improve mobility.

ITS Assets Availability - NWRO, 2022

Device Type	Number of Devices	% of Time Devices were Online
CCTV	124	98.8%
CCTV Portable	18	96.7%
CMS	32	94.9%
CMS Portable	38	95.5%

Safety Service Patrol Coverage

Coverage as of December 31, 2022



Interstate	Miles Covered	% Miles Covered	Mile-Hours Covered/Week	% Mile-Hours/Week
I-64	29	59%	2,412	29%
I-66	18	67%	2,016	44%
Grand Total	47	62%	4,428	35%

SSP Coverage Legend (Hours Per Day/Days Per Week)
 ■ 12/5 ■ 12/7 ■ 16/7 ■ No SSP

Camera Coverage

Cameras (CCTV) as of December 31, 2022



Interstate	Directional Miles of Camera Coverage	Estimated % Miles Covered by CCTV
I-64	44	45%
I-66	19	34%
Grand Total	62	41%

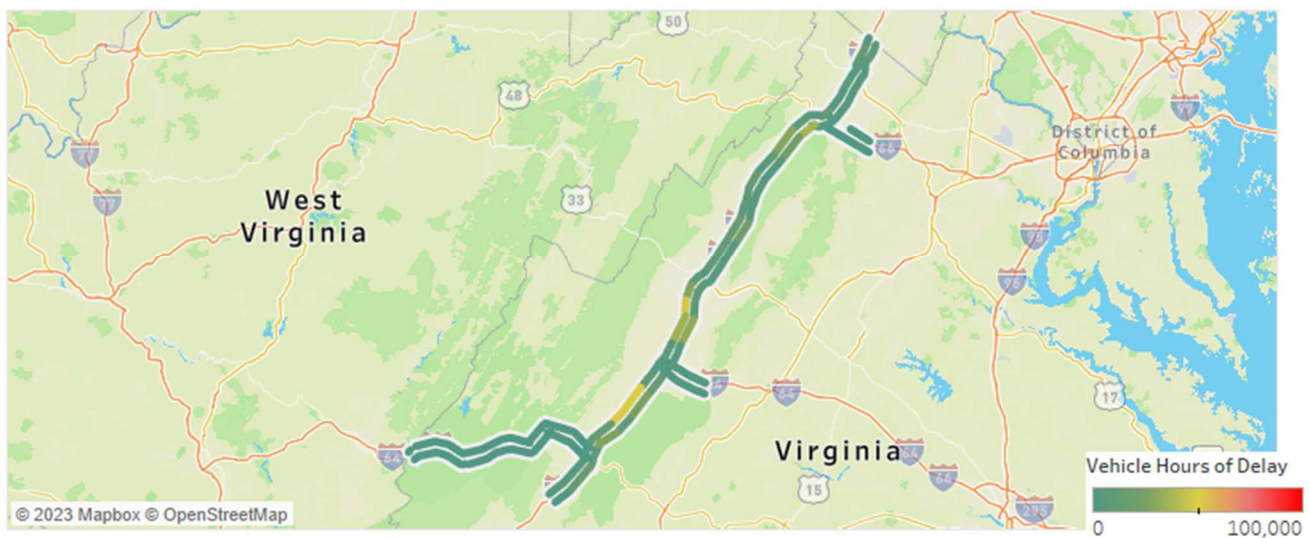
Coverage assumes that cameras can only see one side of the interstate unless it is in the median. 1 mile upstream and downstream is assumed to be covered by each camera.

Staunton District

This report compares performance of Interstate Highways from 2021 to 2022

Measure		Target	2021	2022
Total Vehicle Hours of Delay on Interstates The additional hours travelers waited in traffic that is moving 20 mph less than free-flow speed		↘	520K	890K
ALL INCIDENTS	All Roads All Reported Incidents Number of disabled vehicle and crash incidents	N/A	12,085	10,308
	All Interstates All Reported Incidents Number of disabled vehicle and crash incidents	N/A	10,562	8,997
	All Interstates Scene Clearance Time Median time from verifying the incident to opening all lanes and shoulders	↘	11	13
	All Interstates Potential Secondary Crash Incidents Estimated # of crash incidents which could be secondary to other incidents	↘	10,569	9,013
LANE IMPACTING INCIDENTS	All Roads Lane Impacting Incidents # of disabled vehicle and crash incidents that block at least one travel lane	N/A	2,277	2,187
	All Interstates Lane Impacting Incidents # of disabled vehicle and crash incidents that block at least one travel lane	N/A	1,157	1,144
	All Interstates Roadway Clearance Time Median time from verifying the incident to opening all travel lanes to traffic	↘	46	45
	All Interstates Lane Impacting Incidents Cleared in < 30 minutes Percentage of Lane Impacting Incidents that are cleared in less than 30 min	30%	33%	34%
	All Interstates Lane Impacting Incidents Cleared in < 90 minutes Percentage of Lane Impacting Incidents that are cleared in less than 90 min	81%	83%	84%

Congestion in 2022

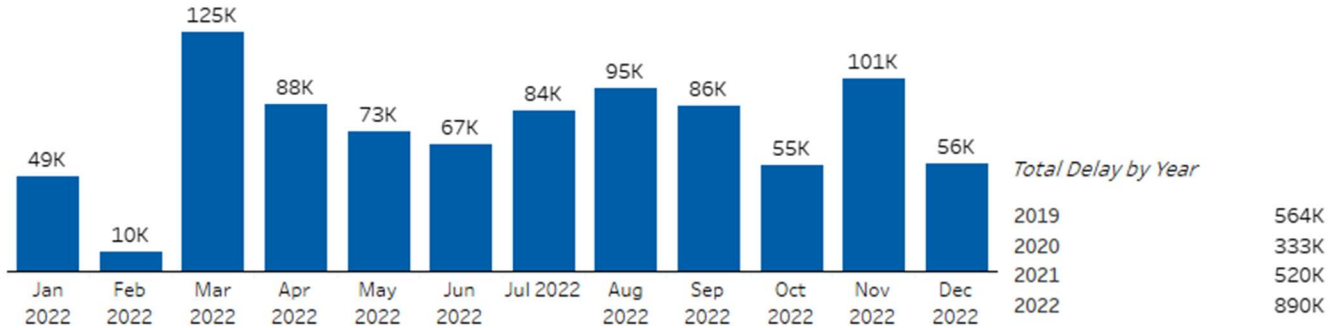




Congestion Overview

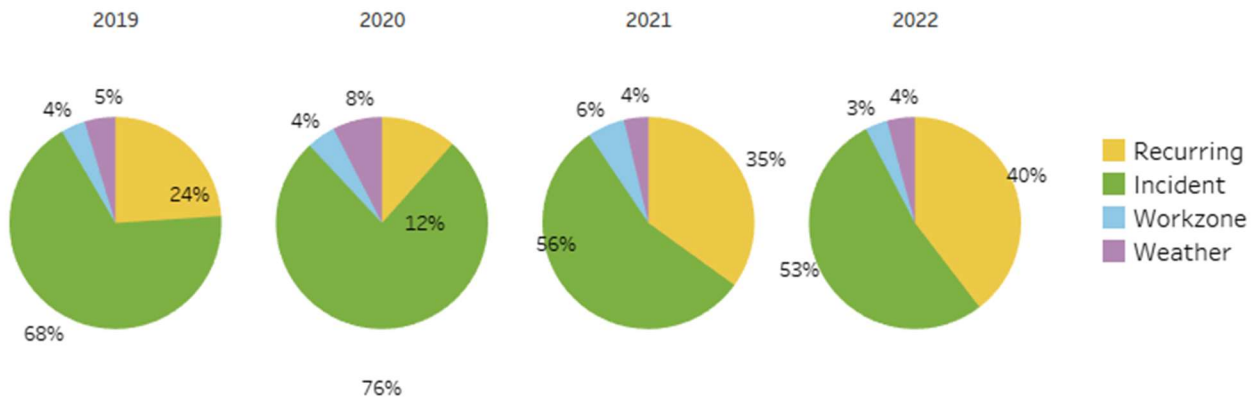
Vehicle Hours of Delay

Total Delay is calculated using INRIX probe speed data and historical VDOT volumes. Delay is calculated when the observed speed is 20 mph or more below free flow conditions.

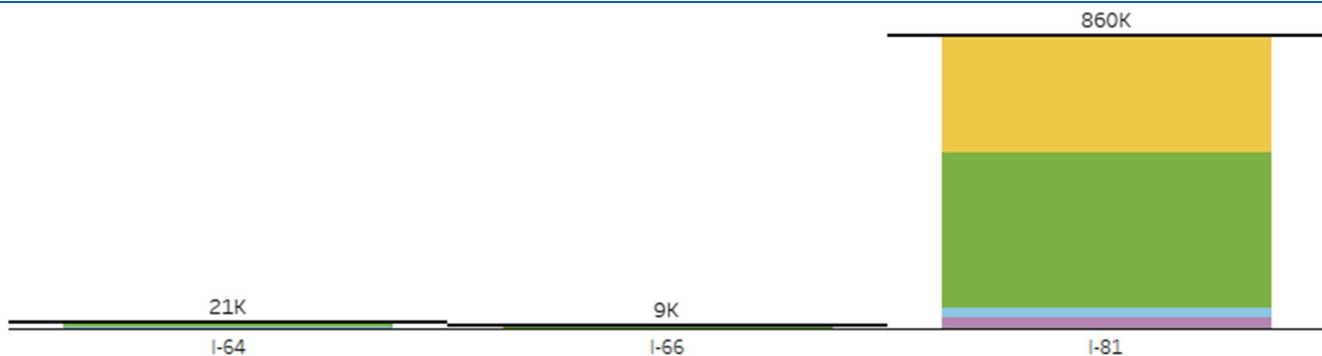


Causes of Congestion

Congestion can be broken down into recurring and non-recurring sources. Recurring congestion is caused by bottlenecks due to high volume or geometric constraints. Sources of non-recurring congestion on interstates include incidents, work zones, and weather events. The amount of congestion due to each of these sources can be estimated at a planning level as shown below.



Delay by Cause & Interstate in 2022



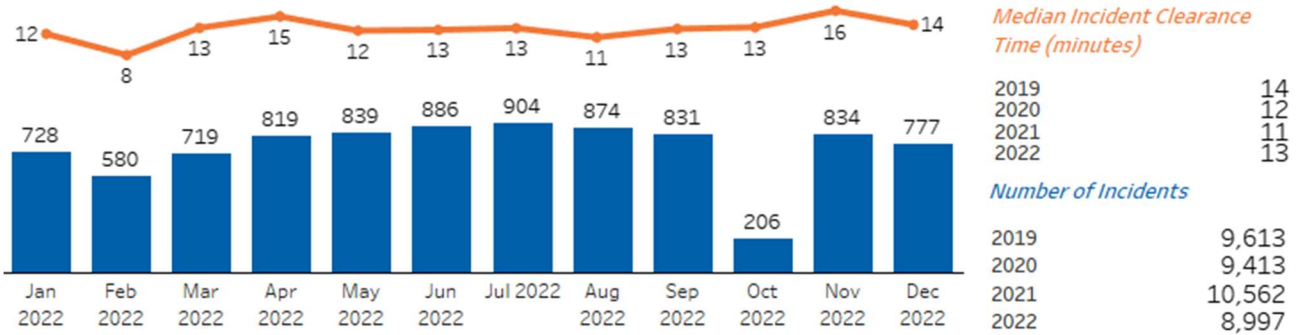


Incidents

Traffic incidents includes both crashes and disabled vehicles and are a frequent cause of non-recurring congestion. Quick clearance programs such as Safety Service Patrols, incident management coordination, and after-action review with the Virginia State Police (VSP) and the other first responders can influence the effects of incidents on traffic.

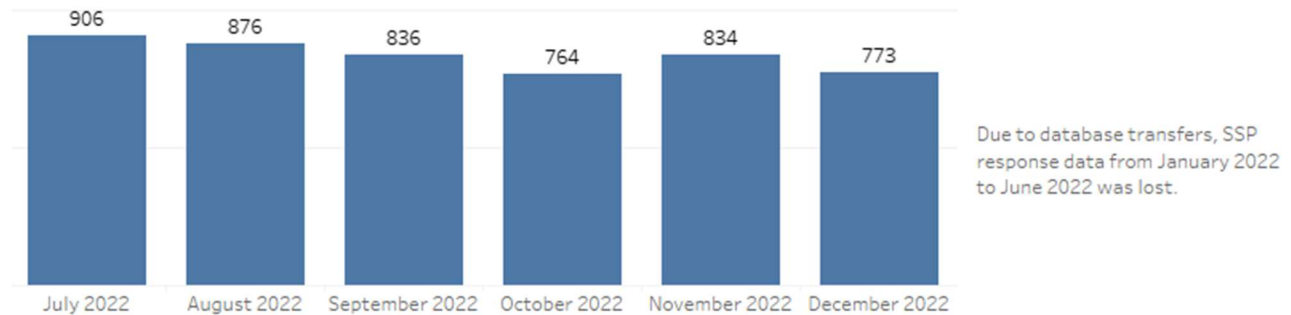
Total Incidents & Incident Clearance Time

Incident Clearance Time (also called Scene Clearance Time) is measures for all crash and disabled vehicle incidents on travel lanes and shoulders. Median Incident Clearance Time is shorter than Median Roadway Clearance Time because it is measures for all incidents, not just those which are lane impacting. A simple incident on a shoulder, such as a vehicle with a flat tire, is often quick to clear. Some Data in October 2022 was permanently lost.

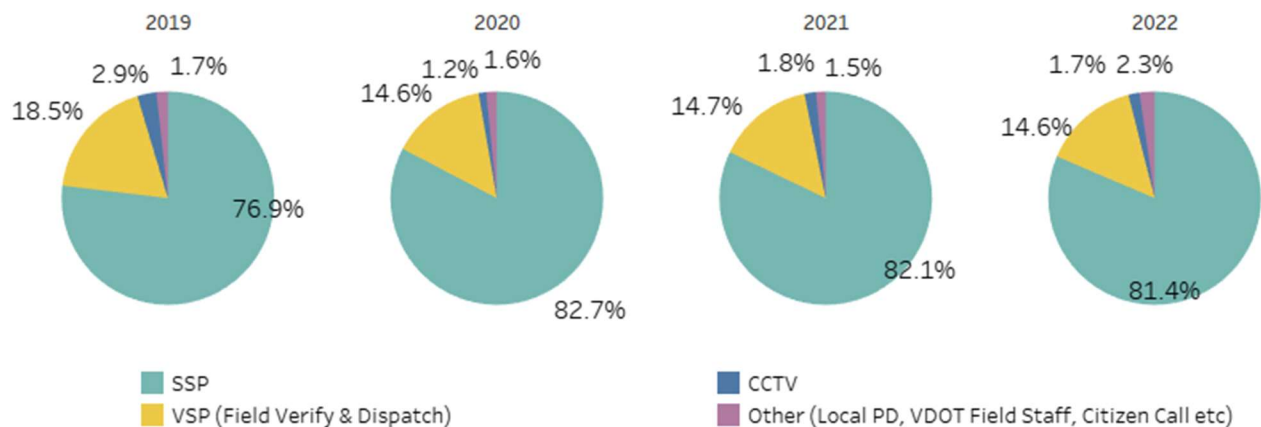


Safety Service Patrol Incident Responses & Response Time

Safety Service Patrol (SSP) Response Time is measured in minutes from the time the SSP Operator was notified to the time they arrived on Scene. This is measured for all disabled vehicle and crash incidents, which an SSP responded to. (Average Response Time between 2 and 60 minutes is measured)



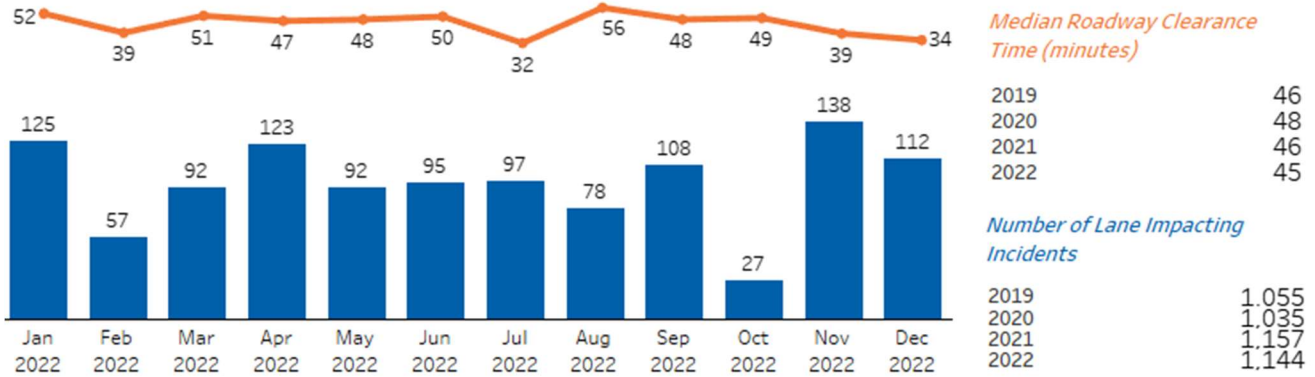
All Incidents by Detection Source





Lane Impacting Incidents & Roadway Clearance Time

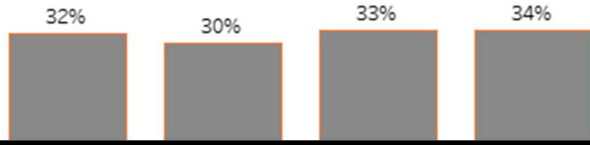
Roadway Clearance Time (RCT) is measured for all disabled vehicle and crash incidents that block at least one travel lane during the course of the incident. RCT is measured from the start of the incident to when all travel lanes are clear and open to traffic.



Lane Impacting Incidents by Roadway Clearance Time

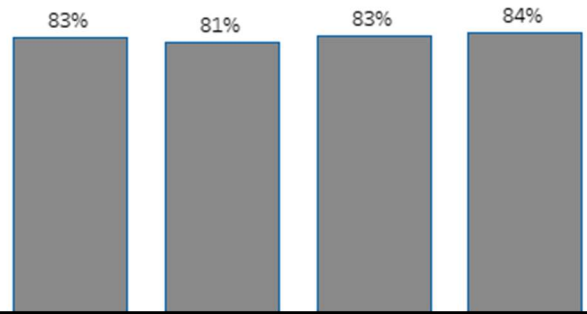
Lane Impacting Incidents Cleared in <30 minutes

2019 2020 2021 2022



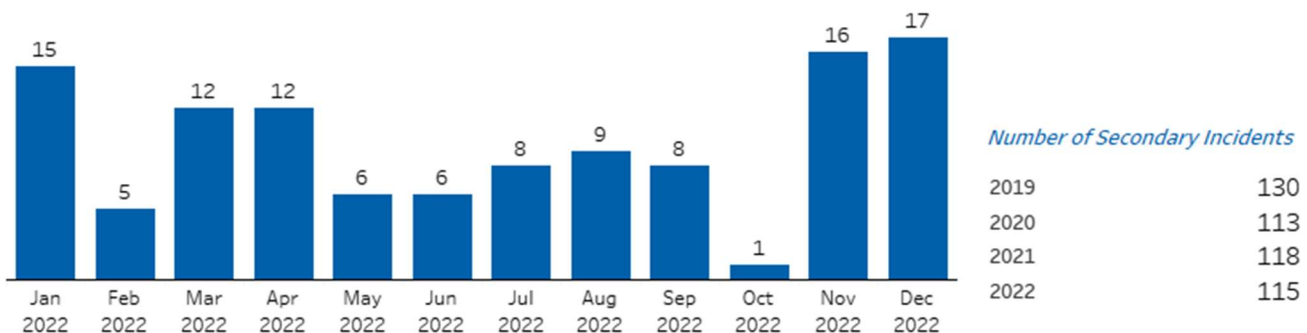
Lane Impacting Incidents Cleared in <90 minutes

2019 2020 2021 2022



Potential Secondary Incidents

The estimated number of crash incidents which could be secondary to other crash or disable vehicle incidents.





Work Zones

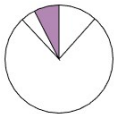
VDOT measures the number and types of work events and the impact on non-recurring congestion. The allowable work hours are regularly reviewed to promote safety and reduce congestion.

Work Zones by Interstate

Work zone event data from VaTraffic

	Number of Lane Impacting Work Zones		Miles-Hours of Lane Impacting Work Zones	
	2021	2022	2021	2022
I-64	422	308	26,641	8,212
I-66	122	22	4,740	353
I-81	854	728	20,238	27,110
Grand Total	1,398	1,058	51,619	35,675

Work event types include: new roadway construction; road widening; resurfacing; paving; bridge replacement; bridge joint, approach, deck, and superstructure repairs; bridge inspections; pavement marking installation; ITS equipment repair and installation; tunnel cleaning; and overhead sign structure repairs. Long-term work zones (>7 days) were not included.



Weather

VDOT measures the number and types of weather events and the impact on non-recurring congestion. The data helps identify emerging maintenance trends.

Weather Type		2021	2022
Fog		208	208
High Wind		58	92
Weather	Road Condition	2021	2022
Snow/Ice	Minor	32,523	27,485
	Moderate	16,489	15,258
	Severe		82

Short Term Weather Events 2022





Operations Assets

Cameras, Signs, and Safety Service Patrols are among the tools used to manage and minimize traffic congestion due to both recurring and non-recurring causes. VDOT measures the coverage areas and condition of these assets that help monitor traffic and improve mobility.

ITS Assets Availability - NWRO, 2022

Device Type	Number of Devices	% of Time Devices were Online
CCTV	124	98.8%
CCTV Portable	18	96.7%
CMS	32	94.9%
CMS Portable	38	95.5%

Safety Service Patrol Coverage

Coverage as of December 31, 2022



Interstate	Miles Covered	% Miles Covered	Mile-Hours Covered/Week	% Mile-Hours/Week
I-64	0	0%	1,008	9%
I-66	13	100%	1,456	67%
I-81	150	100%	16,800	67%
Grand Total	163	71%	19,264	50%

SSP Coverage Legend (Hours Per Day/Days Per Week)
■ 12/7 ■ 16/7 ■ No SSP

Camera Coverage

Cameras (CCTV) as of December 31, 2022



Interstate	Directional Miles of Camera Coverage	Estimated % Miles Covered by CCTV
I-64	20	14%
I-66	6	23%
I-81	129	43%
Grand Total	154	33%

Coverage assumes that cameras can only see one side of the interstate unless it is in the median. 1 mile upstream and downstream is assumed to be covered by each camera.

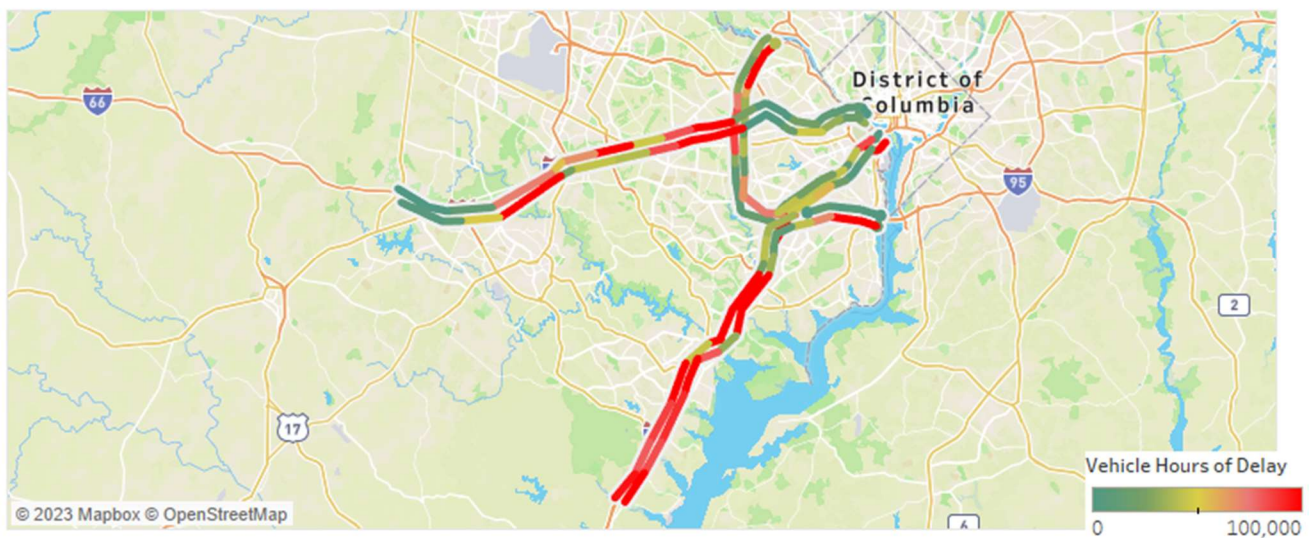


Northern Virginia District

This report compares performance of Interstate Highways from 2021 to 2022

Measure		Target	2021	2022
Total Vehicle Hours of Delay on Interstates The additional hours travelers waited in traffic that is moving 20 mph less than free-flow speed		⬇️	6,102K	7,472K
ALL INCIDENTS	All Reported Incidents Number of disabled vehicle and crash incidents	N/A	26,937	28,722
	All Reported Incidents Number of disabled vehicle and crash incidents	N/A	24,457	26,360
	Scene Clearance Time Median time from verifying the incident to opening all lanes and shoulders	⬇️	32	35
	Potential Secondary Crash Incidents Estimated # of crash incidents which could be secondary to other incidents	⬇️	24,478	26,409
LANE IMPACTING INCIDENTS	Lane Impacting Incidents # of disabled vehicle and crash incidents that block at least one travel lane	N/A	6,429	5,991
	Lane Impacting Incidents # of disabled vehicle and crash incidents that block at least one travel lane	N/A	5,141	4,880
	Roadway Clearance Time Median time from verifying the incident to opening all travel lanes to traffic	⬇️	41	34
	Lane Impacting Incidents Cleared in < 30 minutes Percentage of Lane Impacting Incidents that are cleared in less than 30 min	49%	38%	46%
	Lane Impacting Incidents Cleared in < 90 minutes Percentage of Lane Impacting Incidents that are cleared in less than 90 min	90%	89%	92%

Congestion in 2022

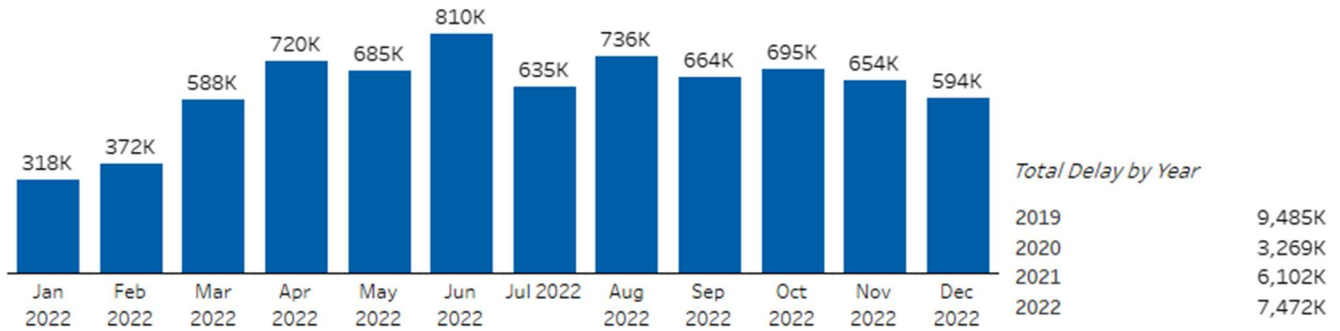




Congestion Overview

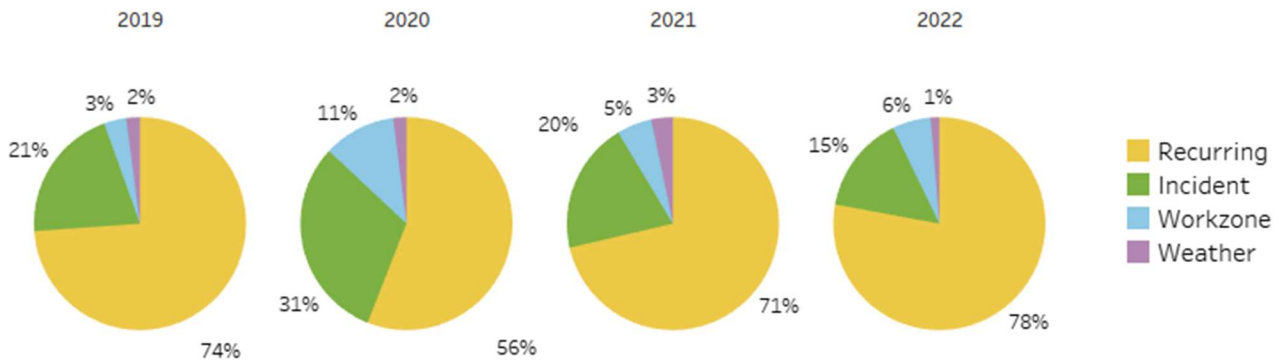
Vehicle Hours of Delay

Total Delay is calculated using INRIX probe speed data and historical VDOT volumes. Delay is calculated when the observed speed is 20 mph or more below free flow conditions.

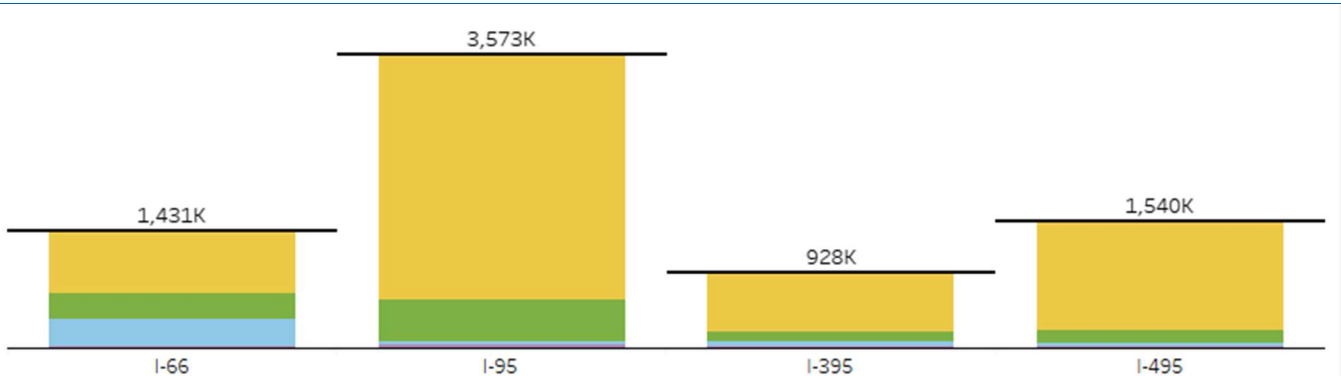


Causes of Congestion

Congestion can be broken down into recurring and non-recurring sources. Recurring congestion is caused by bottlenecks due to high volume or geometric constraints. Sources of non-recurring congestion on interstates include incidents, work zones, and weather events. The amount of congestion due to each of these sources can be estimated at a planning level as shown below.



Delay by Cause & Interstate in 2022





Incidents

Traffic incidents includes both crashes and disabled vehicles and are a frequent cause of non-recurring congestion. Quick clearance programs such as Safety Service Patrols, incident management coordination, and after-action review with the Virginia State Police (VSP) and the other first responders can influence the effects of incidents on traffic.

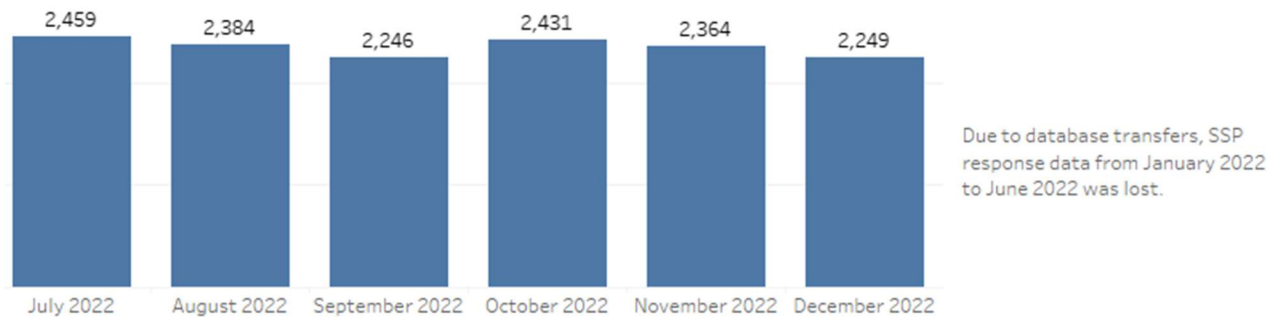
Total Incidents & Incident Clearance Time

Incident Clearance Time (also called Scene Clearance Time) is measures for all crash and disabled vehicle incidents on travel lanes and shoulders. Median Incident Clearance Time is shorter than Median Roadway Clearance Time because it is measures for all incidents, not just those which are lane impacting. A simple incident on a shoulder, such as a vehicle with a flat tire, is often quick to clear. Some Data in October 2022 was permanently lost.

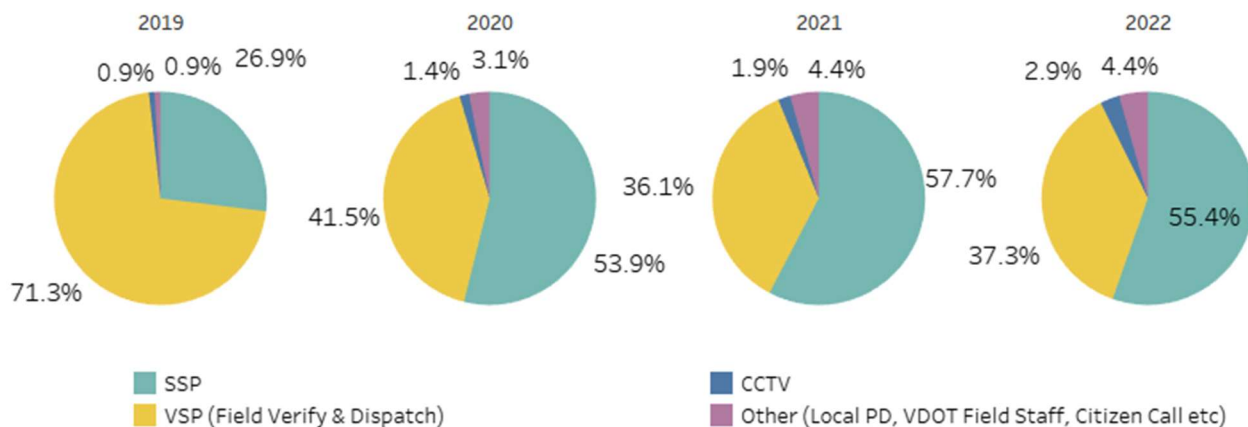


Safety Service Patrol Incident Responses & Response Time

Safety Service Patrol (SSP) Response Time is measured in minutes from the time the SSP Operator was notified to the time they arrived on Scene. This is measured for all disabled vehicle and crash incidents, which an SSP responded to. (Average Response Time between 2 and 60 minutes is measured)



All Incidents by Detection Source





Lane Impacting Incidents & Roadway Clearance Time

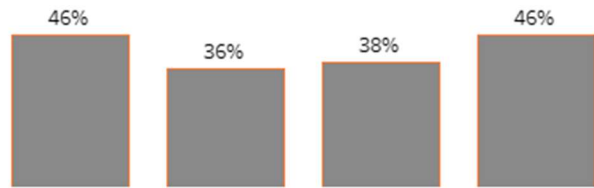
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Lane Impacting Incidents by Roadway Clearance Time

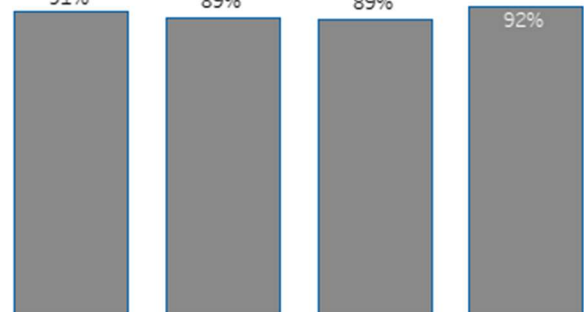
Lane Impacting Incidents Cleared in <30 minutes

2019 2020 2021 2022



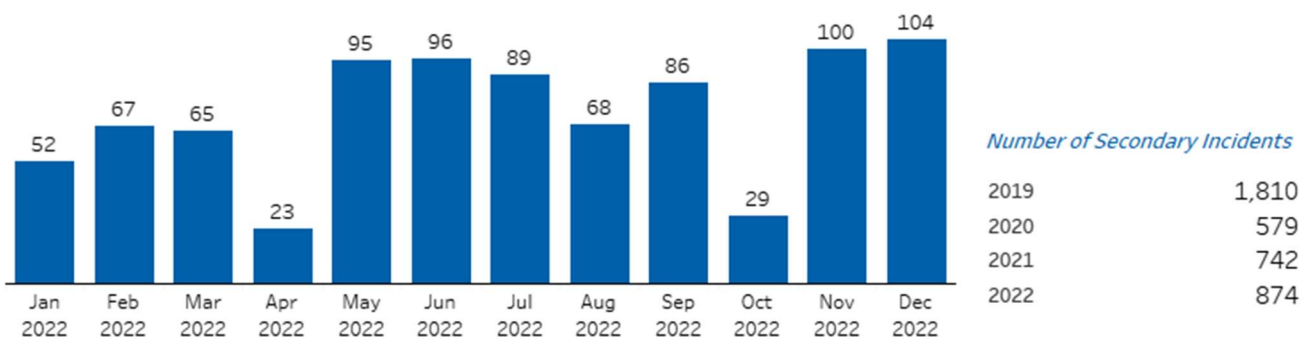
Lane Impacting Incidents Cleared in <90 minutes

2019 2020 2021 2022



Potential Secondary Incidents

The estimated number of crash incidents which could be secondary to other crash or disable vehicle incidents.





Work Zones

VDOT measures the number and types of work events and the impact on non-recurring congestion. The allowable work hours are regularly reviewed to promote safety and reduce congestion.

Work Zones by Interstate

Work zone event data from VaTraffic

	Number of Lane Impacting Work Zones		Miles-Hours of Lane Impacting Work Zones	
	2021	2022	2021	2022
I-66	3,806	3,820	48,392	49,108
I-95	516	181	10,260	1,179
I-395	224	250	2,146	3,770
I-495	404	546	2,388	2,811
Grand Total	4,950	4,797	63,186	56,868

Work event types include: new roadway construction; road widening; resurfacing; paving; bridge replacement; bridge joint, approach, deck, and superstructure repairs; bridge inspections; pavement marking installation; ITS equipment repair and installation; tunnel cleaning; and overhead sign structure repairs. Long-term work zones (>7 days) were not included.



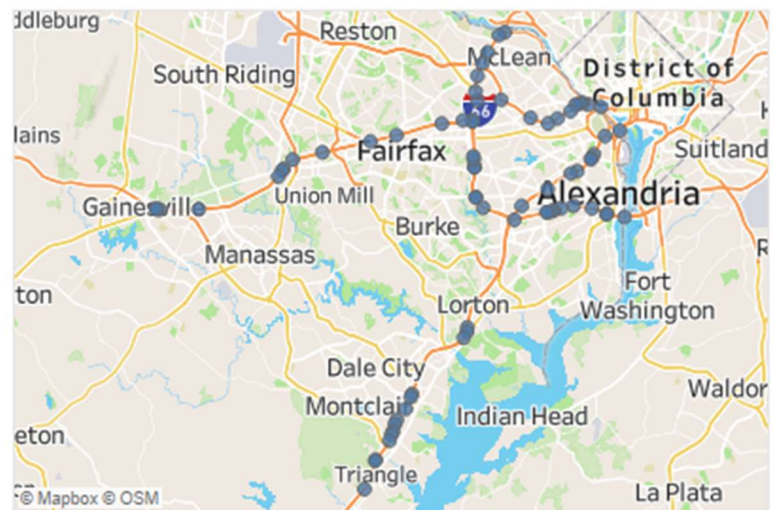
Weather

VDOT measures the number and types of weather events and the impact on non-recurring congestion. The data helps identify emerging maintenance trends.

Weather Type		2021	2022
High Wind		1	
Icy Conditions		19	28
Other		33	30
Standing Water (P..		61	33

Weather	Road Condition	2021	2022
Snow/Ice	Minor	49	2,416
	Moderate		1,419
	Severe		0
	Closed		169

Short Term Weather Events 2022





Operations Assets

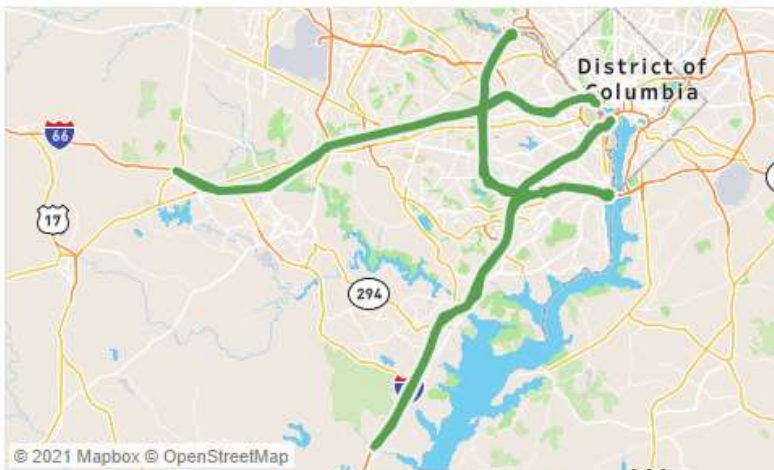
Cameras, Signs, and Safety Service Patrols are among the tools used to manage and minimize traffic congestion due to both recurring and non-recurring causes. VDOT measures the coverage areas and condition of these assets that help monitor traffic and improve mobility.

ITS Assets Availability - NRO, 2022

Device Type	Number of Devices	% of Time Devices were Online
CCTV	280	92.6%
CCTV Portable	21	97.8%
CMS	121	97.6%
CMS Portable	15	97.8%

Safety Service Patrol Coverage

Coverage as of December 31, 2022

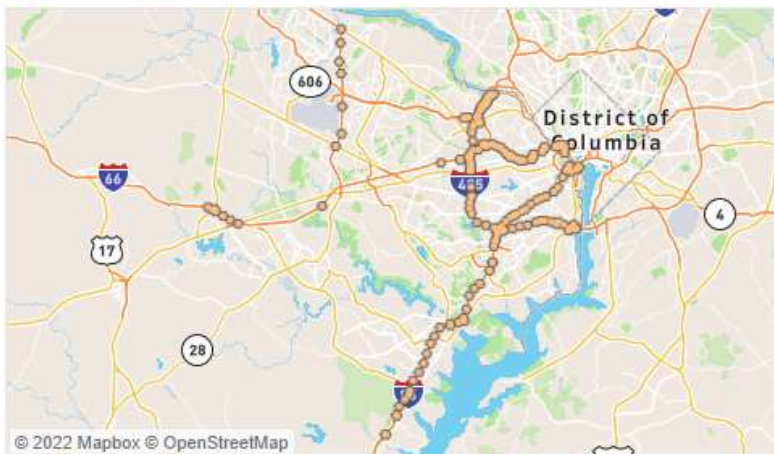


Interstate	Miles Covered	% Miles Covered	Mile-Hours Covered/Week	% Mile-Hours/Week
I-66	35	100%	5,880	100%
I-95	30	100%	5,040	100%
I-395	10	100%	1,680	100%
I-495	22	100%	3,696	
Grand Total	97	100%	16,296	

SSP Coverage Legend (Hours Per Day/Days Per Week)
■ 24/7

Camera Coverage

Cameras (CCTV) as of December 31, 2022



Interstate ¹	Directional Miles of Camera Coverage	Estimated % Miles Covered by CCTV
I-66	31	44%
I-95	49	82%
I-395	15	73%
I-495	43	97%
Grand Total	137	71%

Coverage assumes that cameras can only see one side of the interstate unless it is in the median.
 1 mile upstream and downstream is assumed to be covered by each camera.