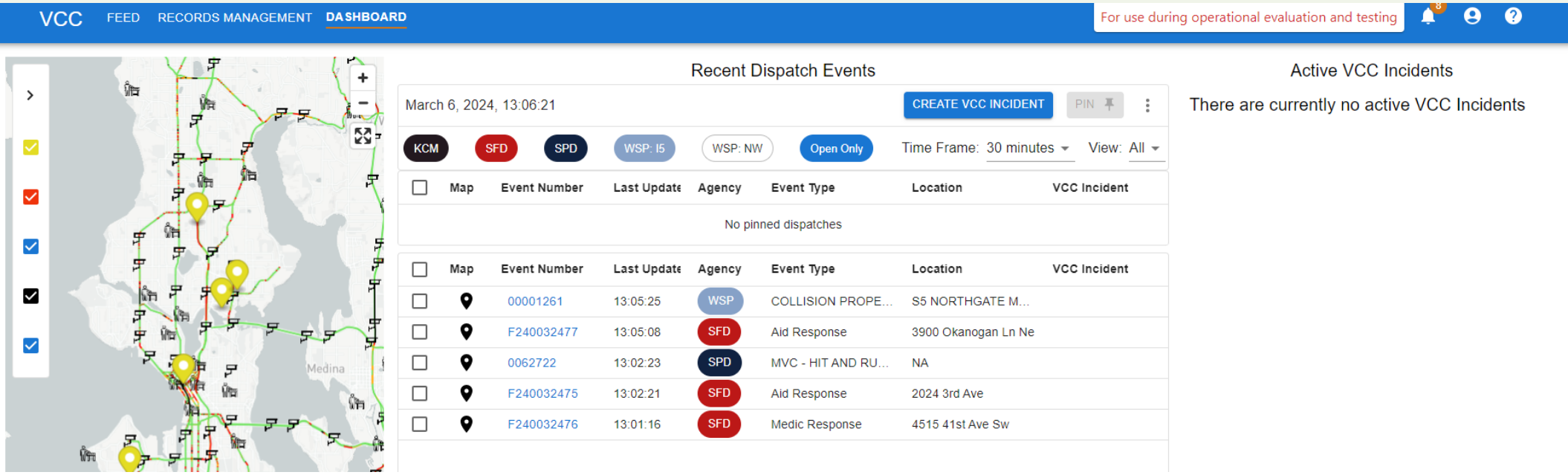


Virtual Coordination Center

Western States Forum 2024

IT Project Manager – Brent Quebedeaux
Incident Management Coordinator – David Baker

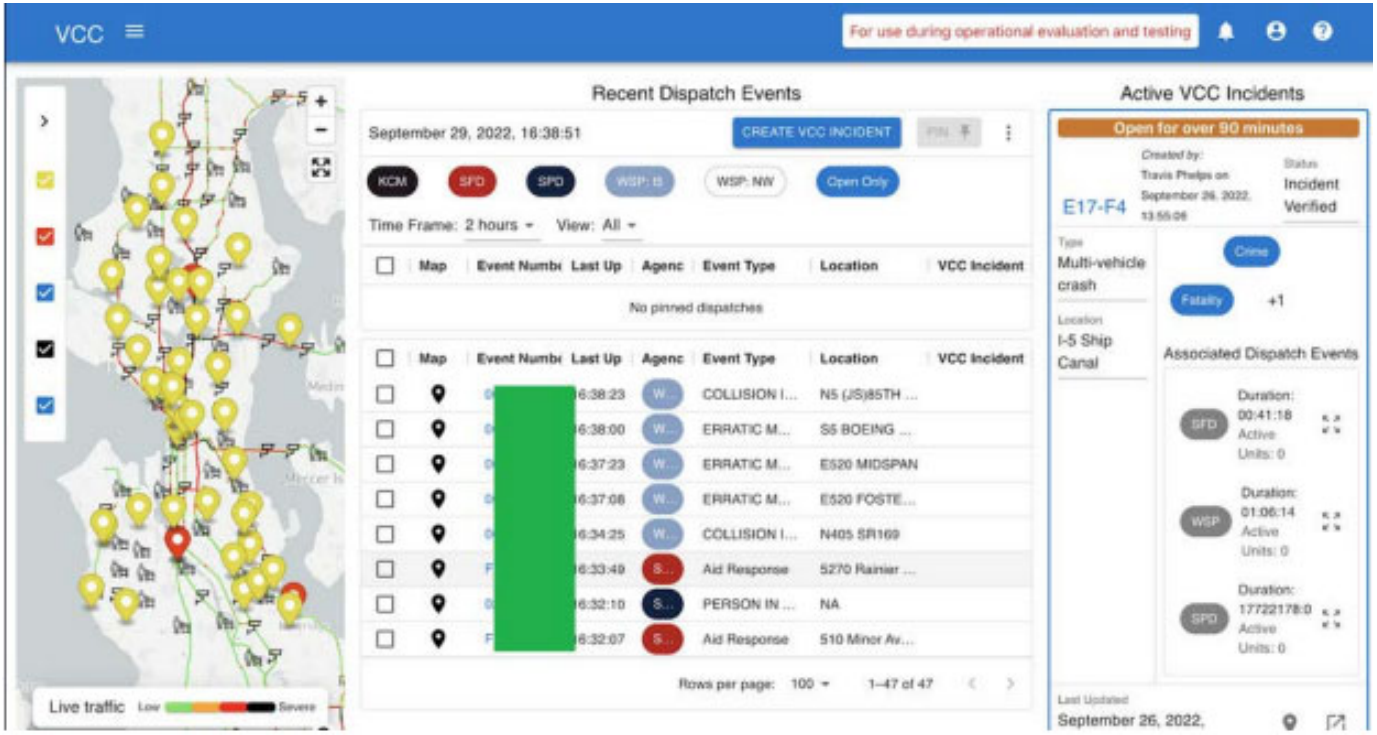
Washington State Department of Transportation

WSDOT

What is the VCC?

Virtual Coordination Center

- The VCC (Virtual Coordination Center) is a web-based incident management tool that allows for the sharing of accurate real time data and coordination between partner agencies. This was created with both public and private partners in the Seattle area and has been live since fall 2022.



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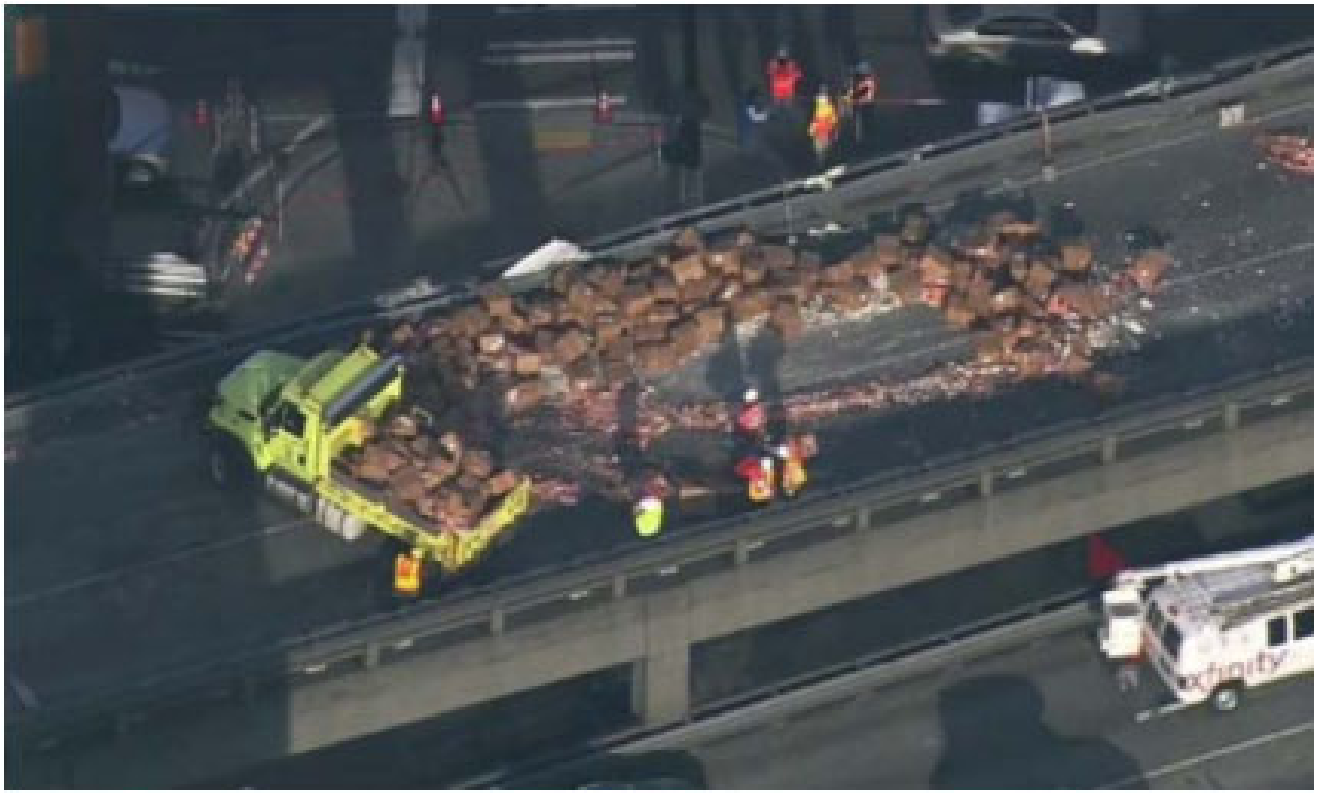
VCC Background

Between 2015 and 2017 there where 3 serious incidents in the greater Seattle area causing major backups.

Duck boat incident on SR 99 in 2015. Multiple fatalities and serious injuries.

VCC Background



Crab Truck incident of 2016. Traffic fully blocked for majority of the day on a major NB/SB state route through downtown Seattle.

VCC Background

2017 multi-vehicle rollover collision involving a propane tanker truck. This incident certainly could have been far worse; gasoline was leaking, and the propane truck could have exploded but that fortunately did not occur. Still, the tanker rollover on the southbound Interstate 5 collector-distributor lanes resulted in the complete closure of I-5 and as well as many on- and off ramps. Clearing this incident required extreme caution due to the propane the truck was hauling. The incident occurred late in the morning after the peak commute but since it took crews eight hours to clear the truck and reopen the roadway the regional transportation system was gridlocked for most of the day, including the evening commute.

VCC Background

The Creation

- Challenge Seattle
- “Beyond Incident Response” report
- SAJOG
- Virtual Coordination Center

Initial parties involved

Deployment of the:

WASHINGTON STATE

VIRTUAL COORDINATION CENTER

for Multimodal Integrated Corridor Management

Washington State Department of Transportation

SDOT · King County Metro · Sound Transit · WSF · Seattle Fire Dept · Seattle Police · Challenge Seattle · aws · Microsoft · Google Maps · Uber · SIEMENS · PARIVEDA · WSP · ReadyOp · The Chamber · Puget Sound Regional Council · Washington Roundtable · The Northwest Seaport Alliance · Greater Seattle Partners · University of Washington

Project Management Team

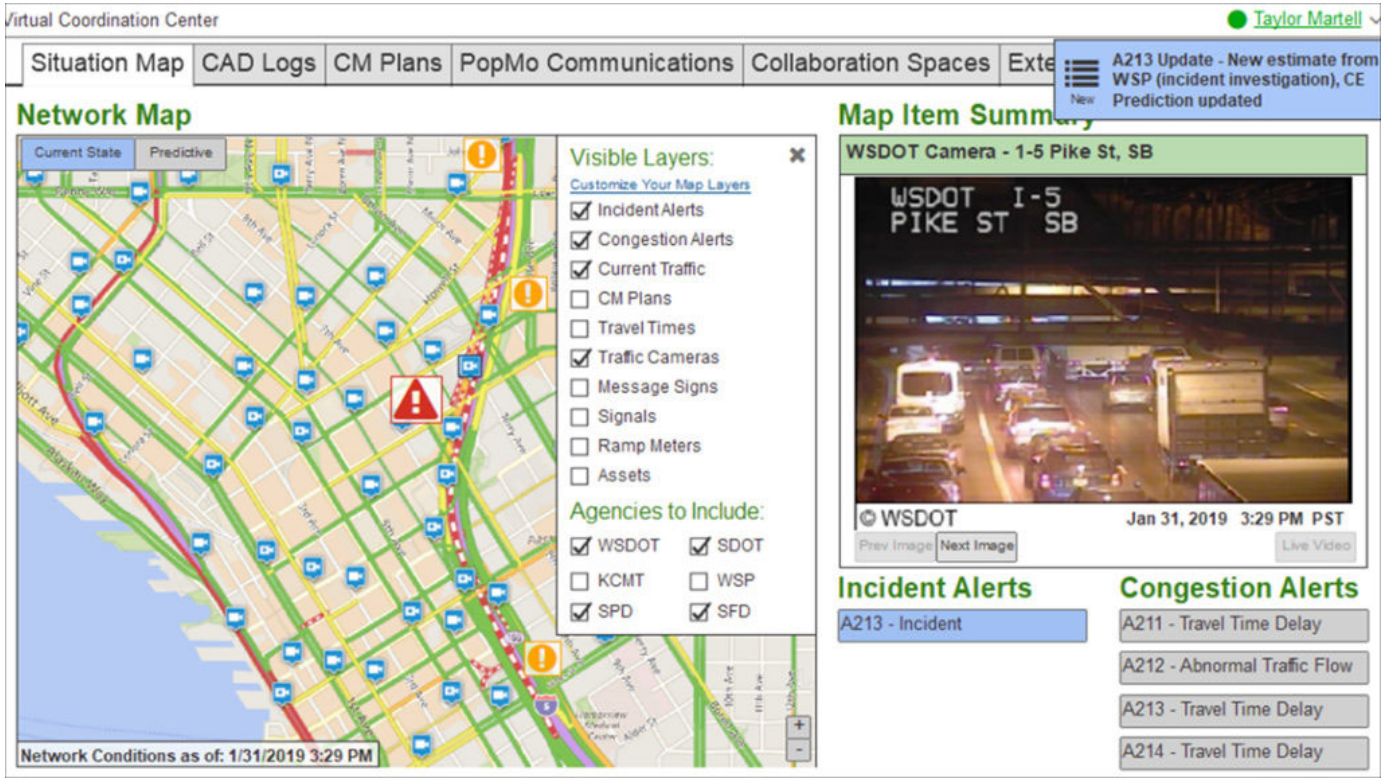
Washington State Department of Transportation

UNIVERSITY of WASHINGTON

PARIVEDA

Initial Steps to Funding

- Initial “Wire Drawing” created by the University Of Washington Mobility Innovation Center in coordination with input from the SAJOG party members and organizations.



Initial Steps to Funding

Funding

Funding of $8.3M

- In-kind match from 6 public agencies and 12 private sector partners

Direct cash investment as of September 2020:

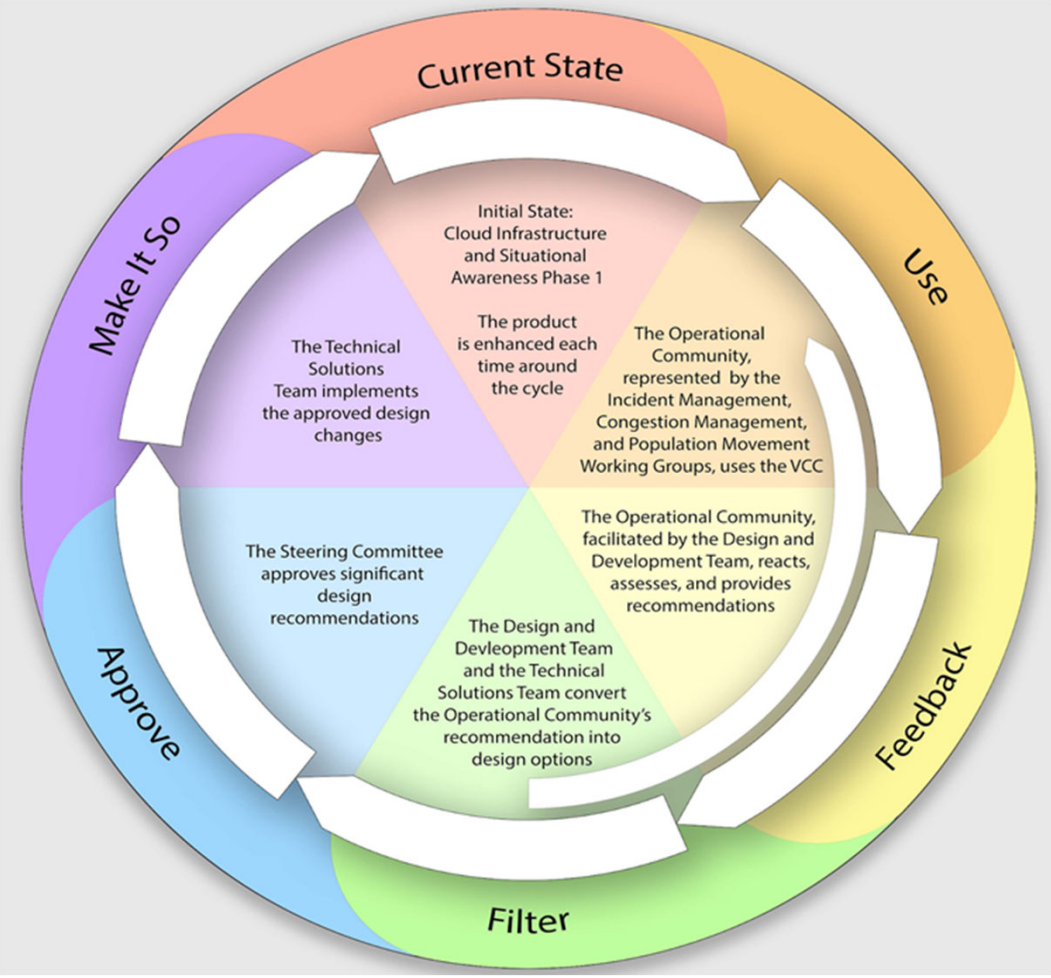
- WSDOT: $1m
- FHWA grant amount: $3.4M
- Challenge Seattle: $330,000

User Agreements

In order to share dispatch feeds between the agencies various user agreements had to be created and signed.

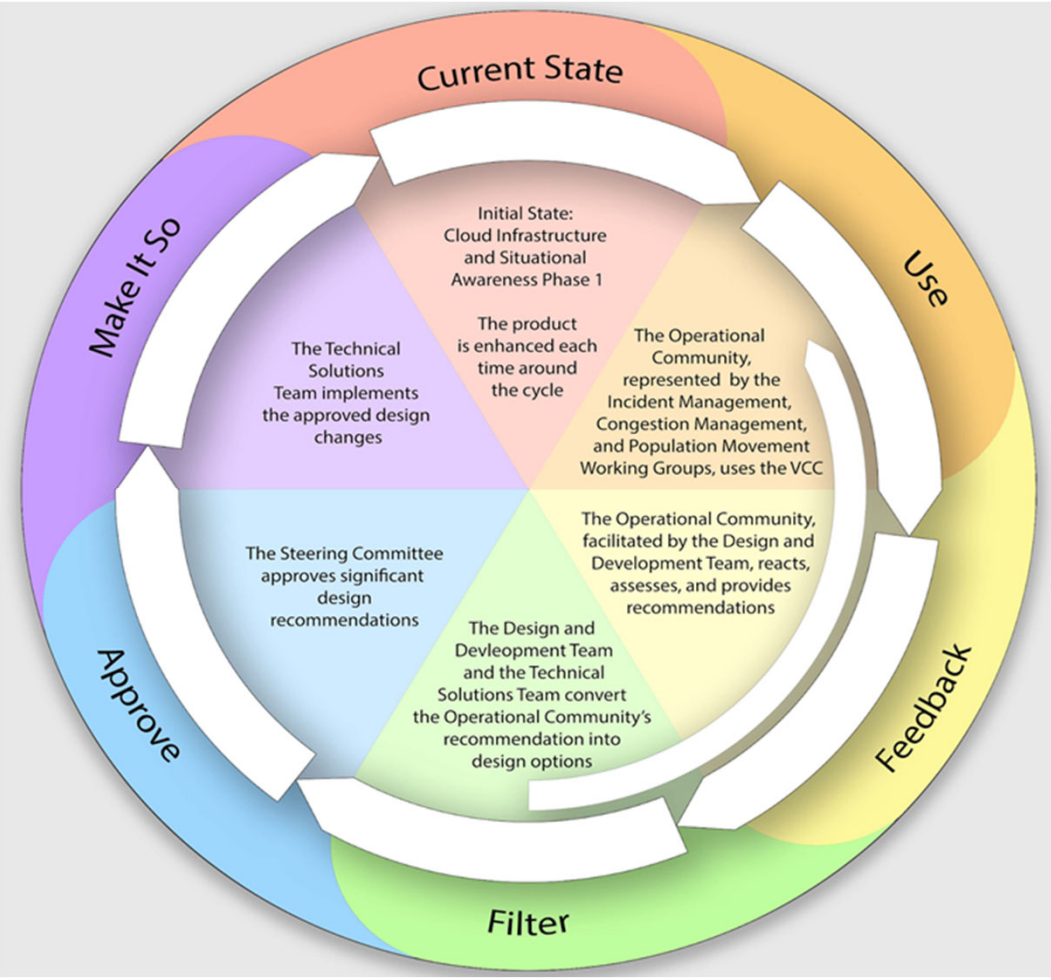
Designing VCC

- Agile Development process
  - Smaller sprint cycles following the agile format
  - Project split up into waves in order to provide deliverables while still constantly adjusting
  - Currently in the final evaluation phase

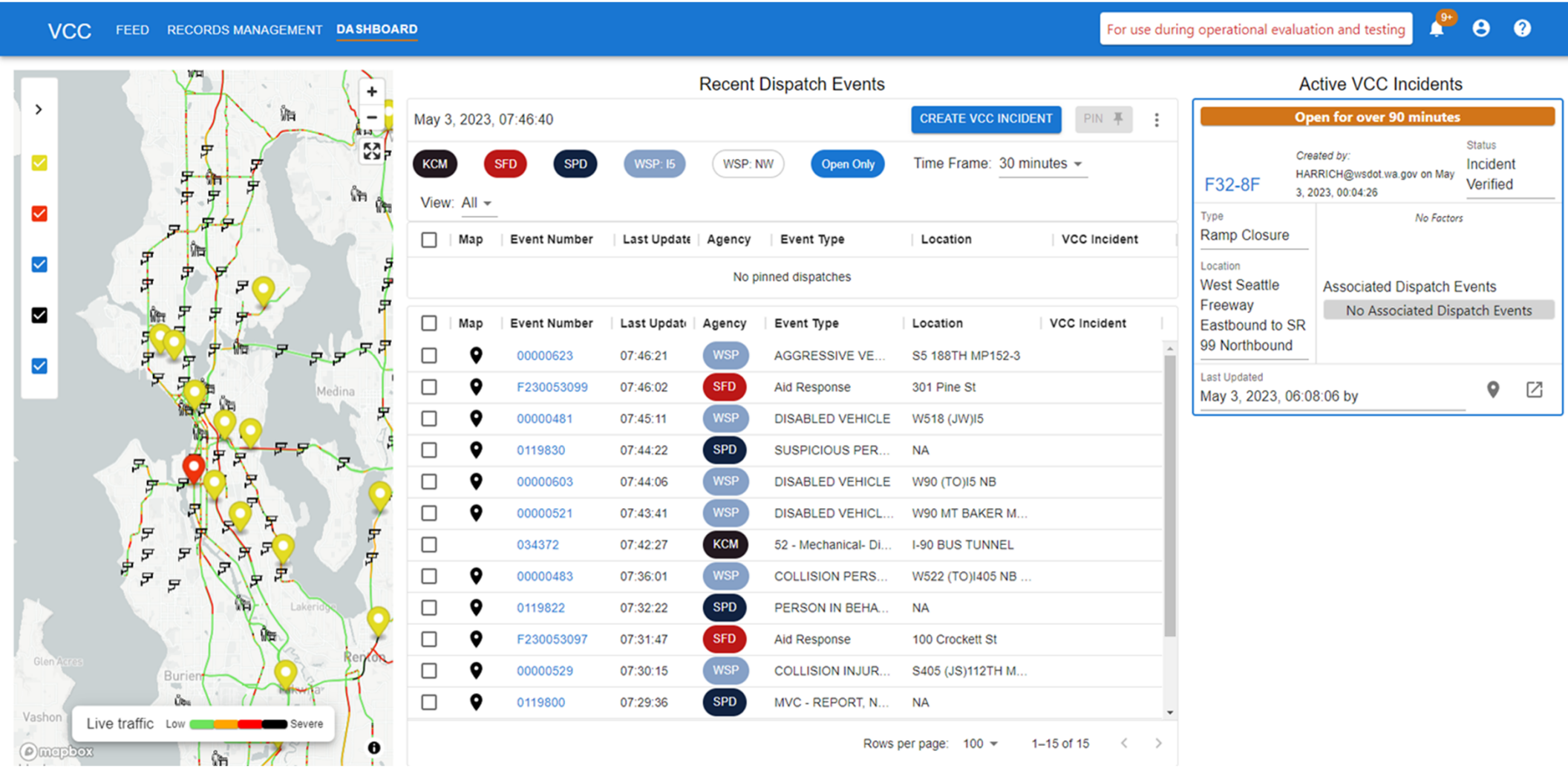


Designing VCC

- Forming of various workgroups
  - Steering committee
  - Operations work group
  - Communications work group
  - User groups
  - ETC….



VCC Completed



WSDOT

Transition VCC to WSDOT

September 2023 the finished product was handed back to WSDOT staff to manage while UW completed the reporting for the USDOT Grant Requirements.

The tool went live and became a part of operations within the partner agencies.

WSDOT's Traffic group at headquarters was able to obtain funding from the state legislature to build and support infostructure to maintain and expand on the current user group of VCC.

WSDOT - VCC

WSDOT secures $1.3M in funding to support VCC staffing, expansion, and support.

Staffing:
• Two full-time IT positions dedicated to support the VCC infrastructure.
• One project full-time IT position dedicated to support the VCC infrastructure and customer service-related issues of the VCC.
• One full-time VCC program administration position and one full-time project VCC support position within the Transportation Operations Division to effectively manage, administer, expand, and enhance the VCC.

Administrative:
• Transfer of vendor agreements from the University of Washington to WSDOT.
• Data sharing and interlocal agreements have been extended by one year through an amendment.
• Continued engagement and collaboration with our current VCC members to ensure a seamless transition.
• Development of a permanent VCC governance structure underway.
• Expansion planning for statewide use of the VCC

VCC Use

VCC Live Presentation
Approximately 10 minutes.

Coordinated Communication

- Incident Models
  - Incident Models are pre agreed upon diversion plan for an area that requires it. Previously, the Joint Operations Group (JOG) based out of the Tacoma Area has brought together Joint Base Lewis McCord, WSDOT, Tacoma DOT and more to identify/agree upon best routes to use in case of a major disaster. The intent is to expand this coordination and planning with all stakeholders for VCC.
  - Incident models will have a visual component showing preapproved routes that can be enacted and adjusted quickly by all stakeholders involved. This will allow all parties to act quickly to move traffic and also allow adjacent parties such as public information officers to inform the public and public transportation to adapt to the most up to date and accurate information.

Where does the VCC live?

- VCC is built on AWS (Amazon Web Services) serverless and managed services.
  - AWS maintains infrastructure (PaaS – platform-as-a-service)
- Authentication provided through SAML (Security Assertion Markup Language) integration with Secure Access Washington (SAW).
- This application is not open to the public.

Mapping Tools

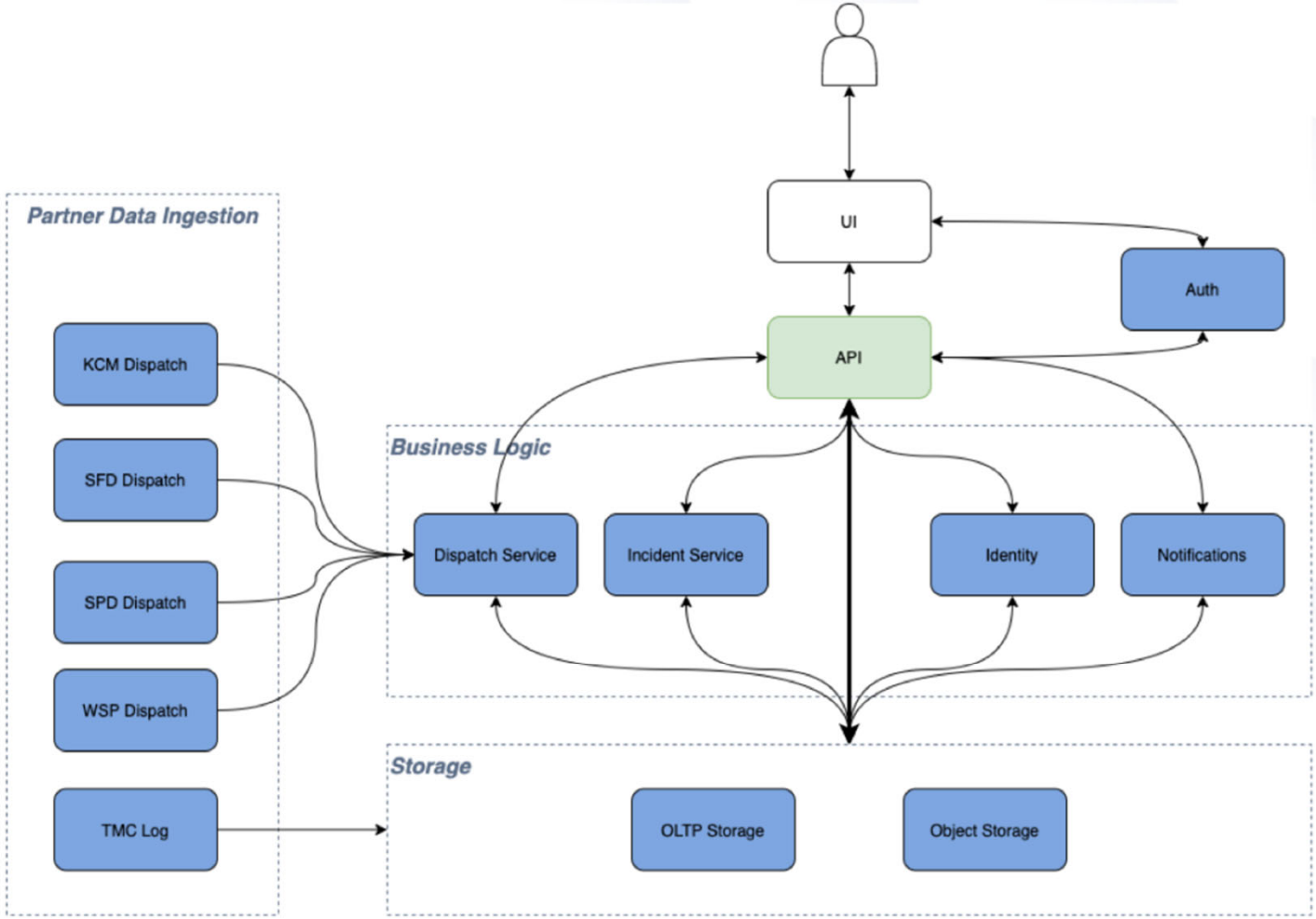
- VCC Map is powered by Mapbox.
  - Mapbox Traffic Data – for traffic layer only
  - Basemap has dispatch events, active incidents, and traffic slow-downs overlayed.
  - Markers and layers used to build map details.
- Traffic Images
  - SDOT and WSDOT traffic images
    - Put into map as symbol layer using a GeoJSON file
- Congestion Mgmt. Data
  - TMC logs are ingested (JSON data) into VCC through Core DynamoDB table.
- Construction Data currently from INRIX.

VCC Architecture

VCC Architecture – Component Integration Architecture

This component integration architecture shows how data flows from Partners into the VCC as well as how users access data that is stored in the VCC.

- The *Auth* component here includes both Authorization and Authentication.
  - Authentication is provided through a SAML integration with Secure Access Washington (SAW).
  - Authorization is performed on each API request and leverages a user's OAuth JWT tokens to evaluate claims (i.e. roles) for the requesting user.
  - In the physical architecture, the API is also fronted by a WAF.
- API requests are handled by both service layers as well as direct proxy integrations with data storage. This provides speed and simplicity when the requesting data or performing simple actions.



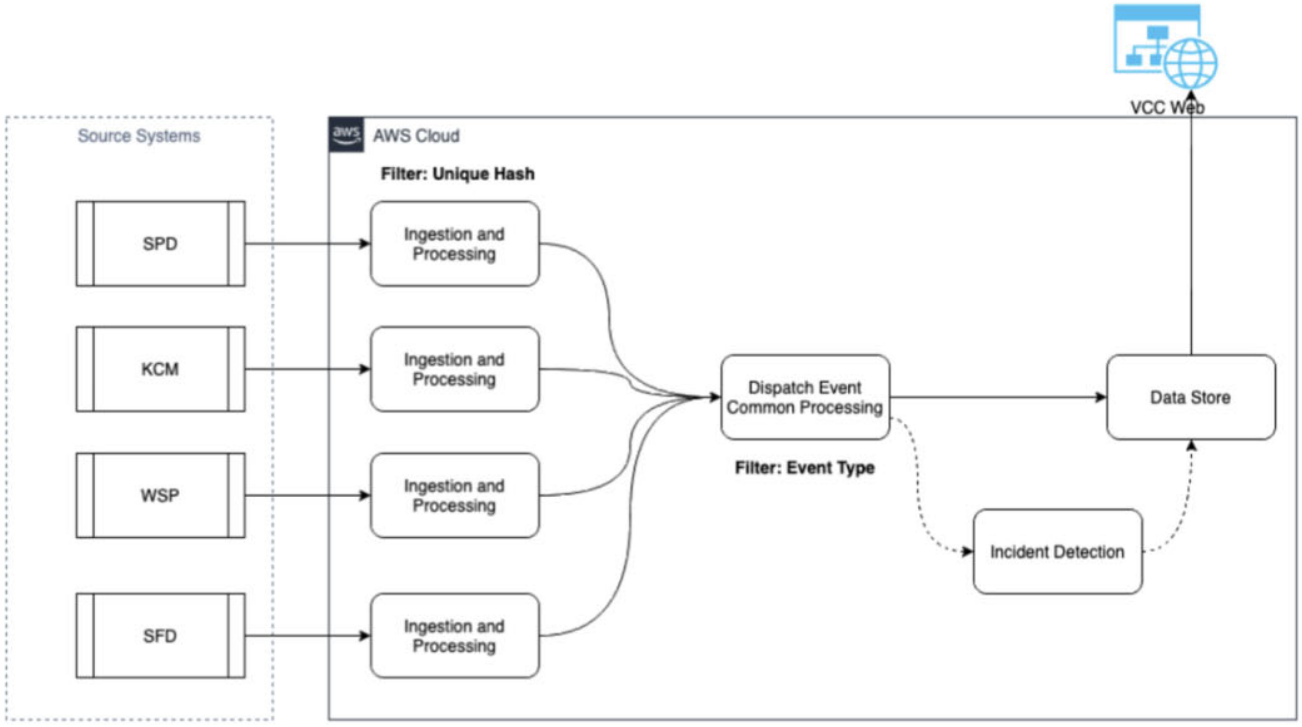
WSDOT

VCC Architecture

VCC Architecture – Dispatch Ingestion

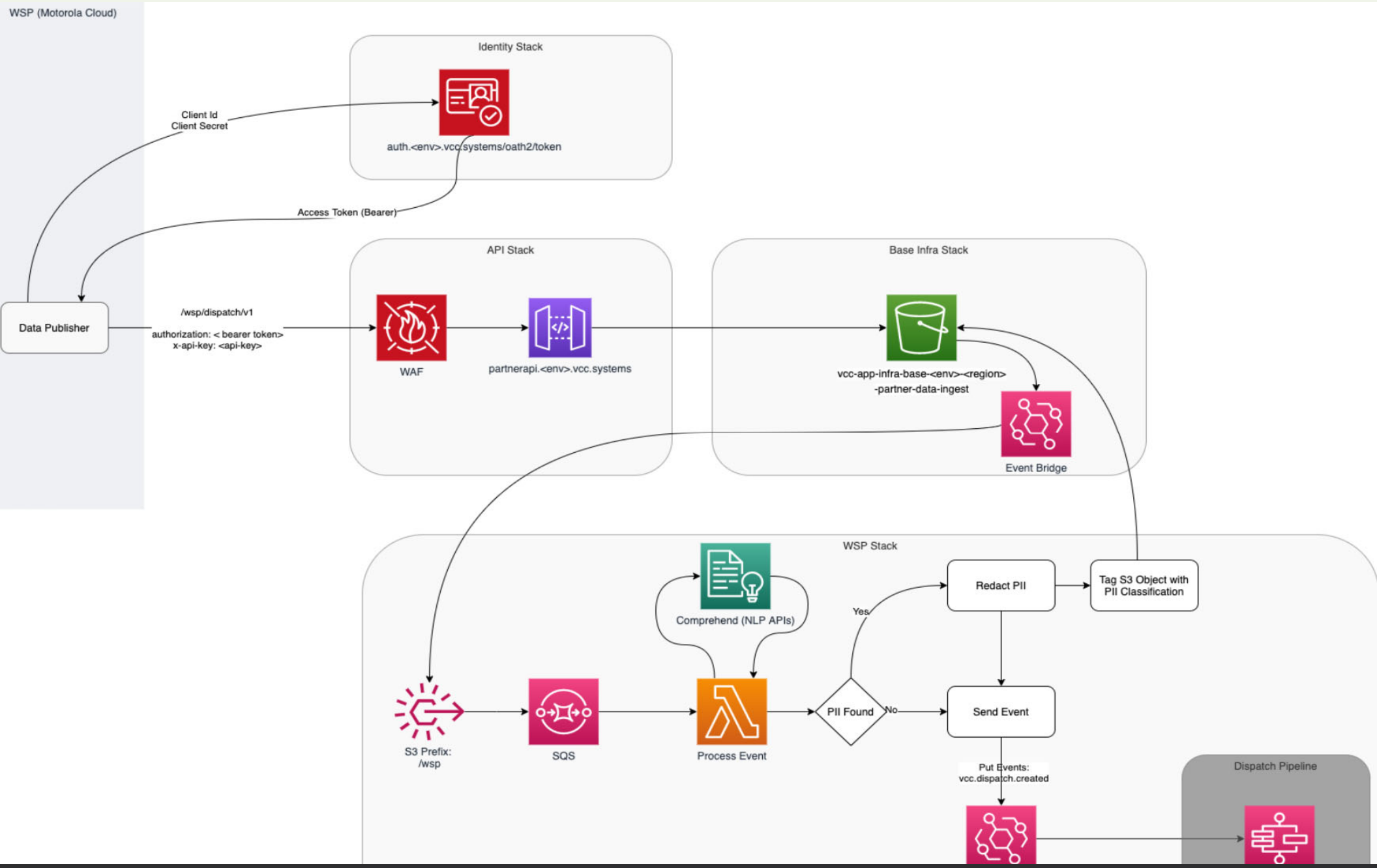
Dispatch Ingestion is managed through a single processing pipeline. ETL Logic is performed on all ingested data sources and data is mapped into a standardized "VCC Dispatch Event" model.

- SPD, SFD, and KCM integrations are setup to operated on 30 seconds batches.
  - Each of these batches provides "snapshot" data that represents the current "open records" in the source system.
  - The VCC takes this data and determines what has changed since the last batch. All records with changes are sent down the pipeline
- VCC filters based on event type to "suppress" dispatches that are not traffic related.
  - This is NOT intended to be a security feature. Source systems are responsible for filtering any sensitive data and/or event types before sending data to the VCC.



WSDOT

VCC (WSP dispatch example)



WSDOT

Incident auto-generation

- The application filters CAD feeds per the following items and will generate an incident when these are identified.

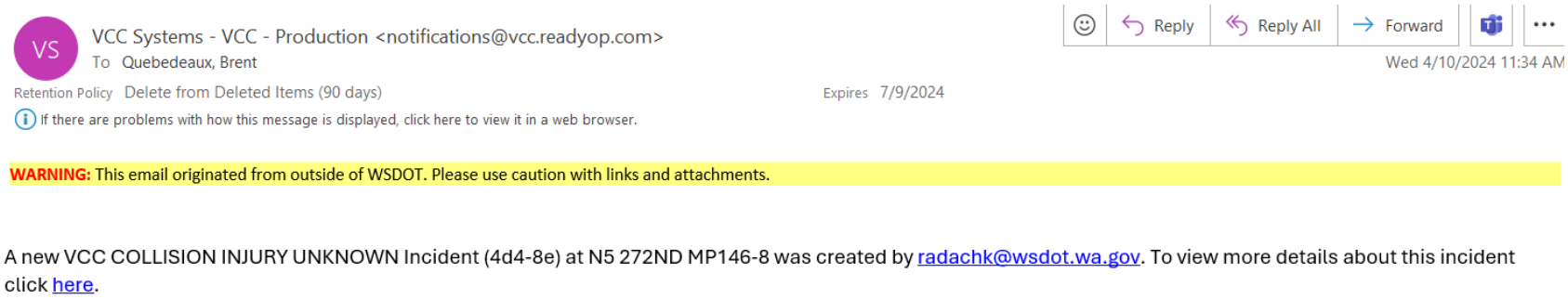
- Event Type= "Tunnel MVI" AND Agency = SFD
- Location Contains "bridge" AND Event Type Contains "blocking"
- Event Type = "Car Fire Freeway" AND Agency = SFD
- Event Type = "Fire Response Freeway" AND Agency = SFD
- Event Type = "Road Closure" AND Area Code = "I5" AND Agency = WSP
- Event Type = "Disabled Vehicle Fire" AND Area Code = "I5" AND Agency = WSP
- Event Type = "Possible suicidal pedestrian on bridge or overpass" AND Area Code = "I5" AND Agency = WSP
- Event Type = "Fatal Traffic Collision" AND Area Code = "I5" AND Agency = WSP

Incident Model

- Incident Logic
  - Rule engine for Incident detection
  - Provides
    - Location, Latitude, Longitude, Start Time, Status
- Update Logic
  - Provides
    - Location, Event Type, Start Time
- Notification
  - Leverage ReadyOp notification groups and contacts to send emails to users
    - Link to event provided in notification

Notifications

- Notifications to users
  - Email notification through ReadyOp
  - Provides incident information, creator, and link to incident.



Partner Agreements

- DSA – Data Sharing Agreements
  - Records retention requirements
  - Transmission and data format
  - Data constraints
  - Oversight
  - File layout

Real Time Traffic Data

- ESRI
  - Transition from INRIX to ESRI
    - Main reason is cost.
  - Need to ingest construction data from existing sources (WSDOT and SDOT)
    - Formerly done by INRIX.

Records Retention

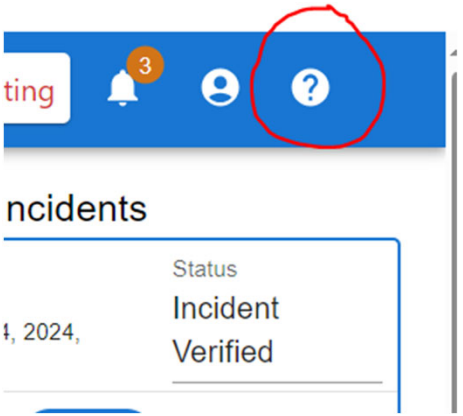
- VCC Records Retention
  - Incidents automatically close in VCC after 30 days.
  - Closed Incidents back to all and involved agencies to follow their retention policies.
  - VCC does not retain information past the thirty day mark.

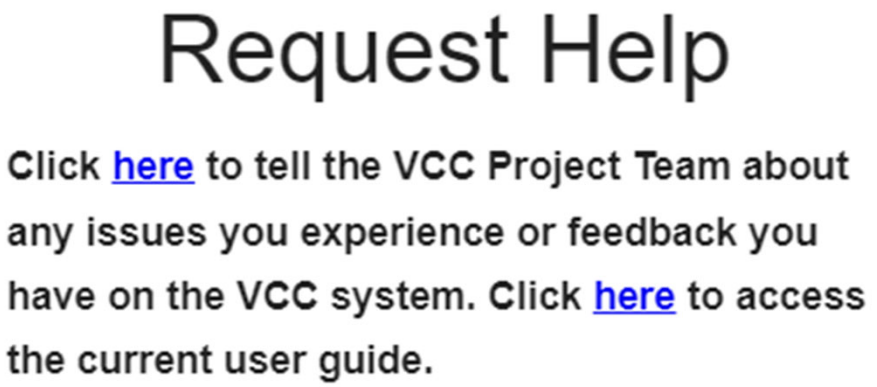
VCC User Guide

- Current user guide and videos were based on Seattle area project.
- Further development will be needed to accommodate partner agencies.

VCC Troubleshooting - Notification

- Help icon on dashboard.
- Users fill in help request for assistance.
- Project team notified via email.

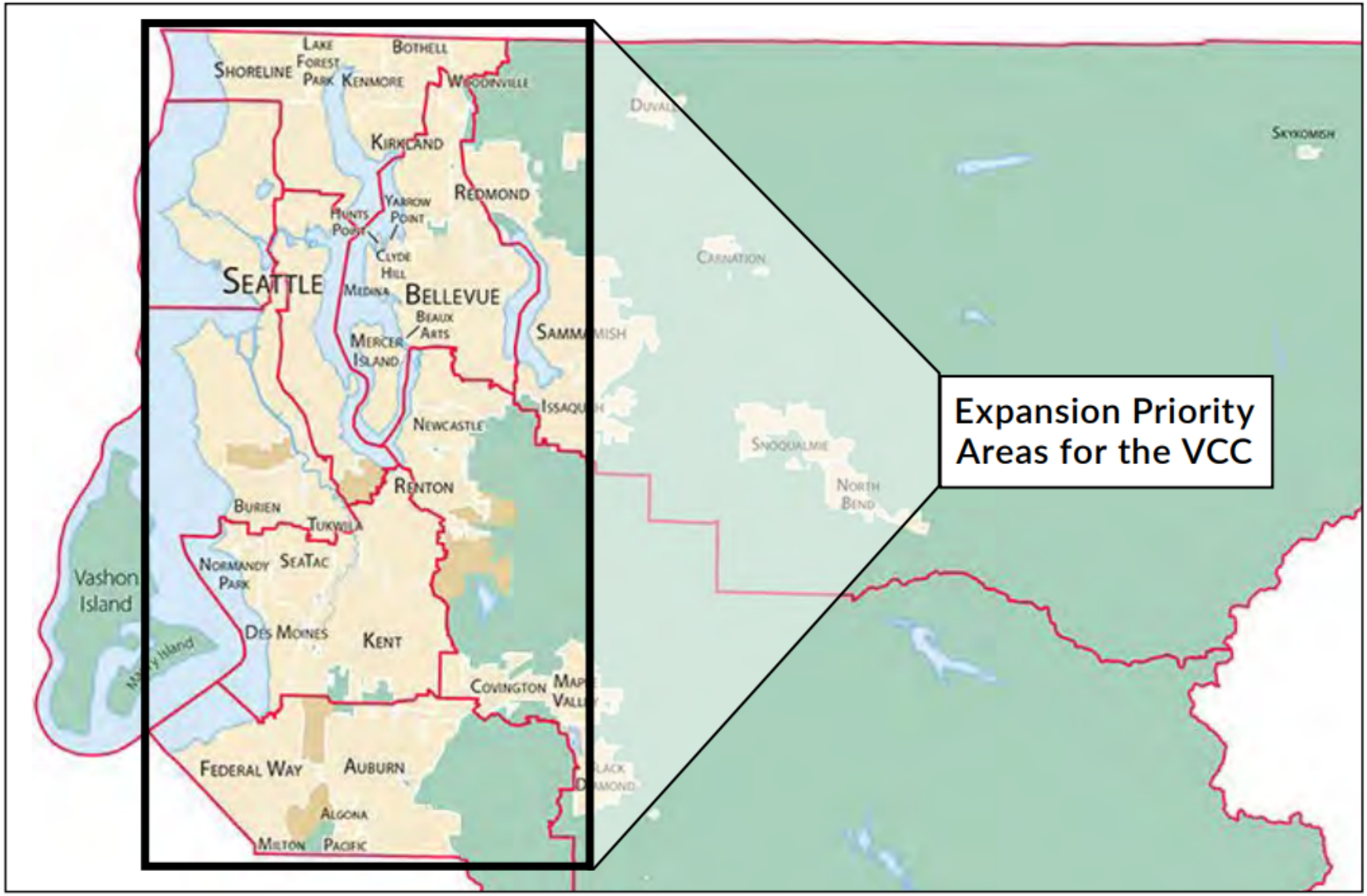




Inclusion of Construction and Major Event Coordination

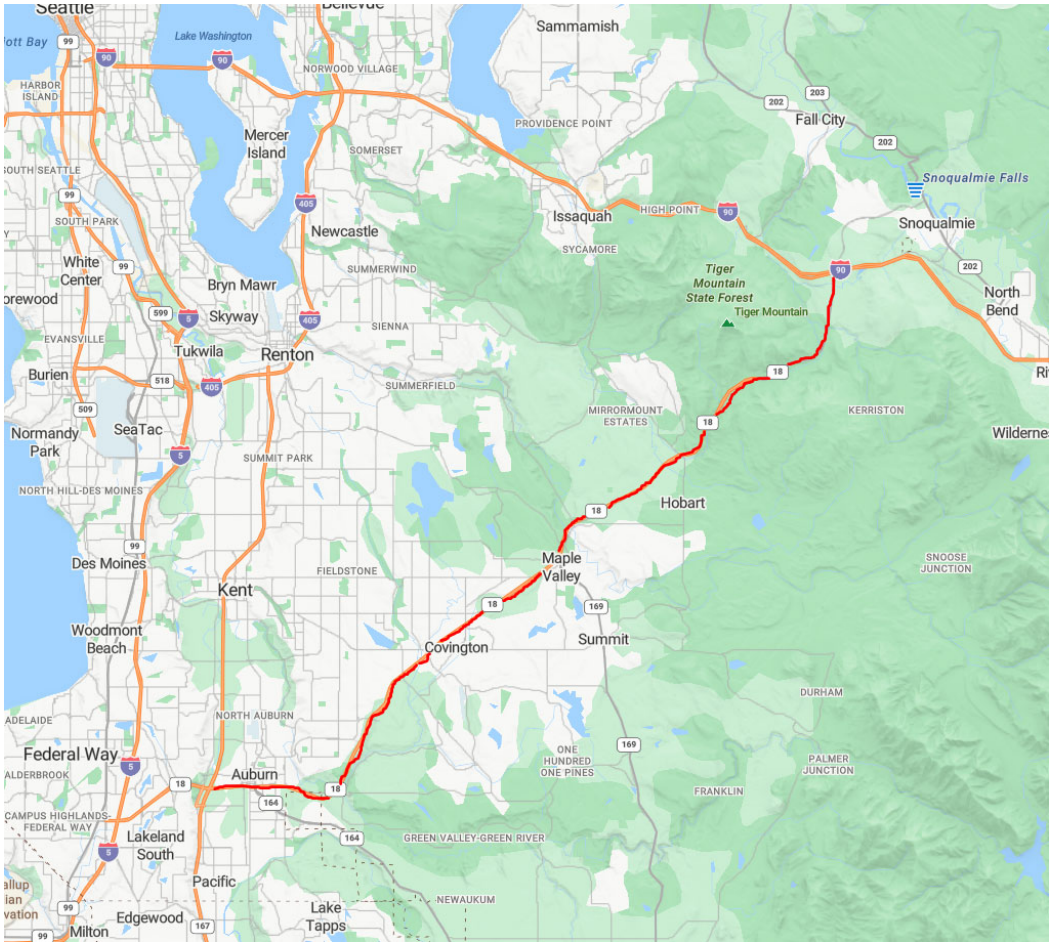
- Plot detours.
- Delay updates.
- Referenceable real time information.

Moving Forward



WSDOT

Moving Forward

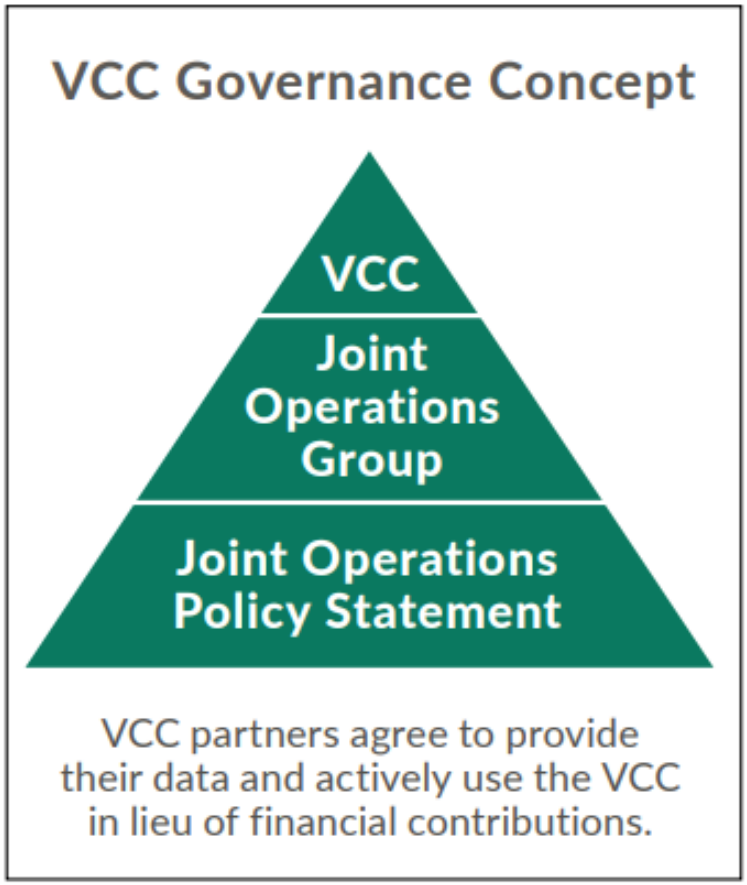


State Route 18 Partner agencies have shown to have a special need for coordination due to the use of this roadway as a bypass of the Seattle area by commercial Vehicles.

Moving Forward

VCC Governance

- Joint Operations Policy Statement (JOPS)
- Joint Operations Groups
- VCC Steering Committee
- Working Groups



Expansion Considerations

- Jurisdictional boundaries
- Layers
- Jurisdiction construction information, outside of major construction events
- Jurisdictions may not have traffic management centers.

Key Takeaways

- Virtual Communication
  - Improvements in direct data sharing specifically with the ability of all agencies to see each others computer aided dispatch feeds in real time.
- Continued engagement with partner agencies
- Constant improvement
- Continued funding and growth goals for the program and with partner agencies.

Lessons Learned

- Keeping Partners involved
- Making strong advocates within local governments
- Continued training and engagement
  - Ongoing exercises
  - Regular check-ins
- Cost of services

Questions?

Contact Info

IT Project Manager
Brent Quebedeaux - Brent.Quebedeaux@wsdot.wa.gov

Incident Management Coordinator
David Baker – Baker.David@wsdot.wa.gov