Washington State Asphalt IC Demonstration

SR 539, Lynden-Aldergrove Port of Entry Improvements, WA (August 25-28, 2014)

On-Site Personnel

First name	Last name	Affiliation	Telephone	Email
FHWA IC Project Team				
George	Chang	Transtec Group	512-659-1231	gkchang@thetranstecgroup.com
Sabrina	Garber	Transtec Group		sgarber@thetranstecgroup.com
Victor Lee	Gallivan	FHWA	317-605-4704	Victor.Gallivan@dot.gov
Bob	Horan	Asphalt Institute	804-539-3036	bhoran@AsphaltInstitute.org
FHWA NC				
Jeff	Horton	FHWA-WA	360-753-9411	jeff.horton@dot.gov
Susan	Ellis	FHWA-WA	360-753-9412	Susan.Ellis@dot.gov
State DOT				
Jeff	Uhlmeyer	WSDOT	360-709-5485	UHLMEYJ@wsdot.wa.gov
Dave	Erickson	WSDOT	360-705-7829	ERICKSD@wsdot.wa.gov
Bob	Dyer	WSDOT	360-705-6980	DYERB@wsdot.wa.gov
Kim	Willoughby	WSDOT	360-705-7978	WILLOUK@wsdot.wa.gov
Jay	Drye	WSDOT	360-757-5993	DRYEJ@wsdot.wa.gov
Chris	Damitio	WSDOT	360-788-7403	DAMITIC@wsdot.wa.gov
Patrick	Fuller	WSDOT	206-941-0784	FULLEP@wsdot.wa.gov
Jason	Koreski	WSDOT	360-788-7410	KORESKJ@wsdot.wa.gov
Mark	Russell	WSDOT	360-709-5479	russelm@wsdot.wa.gov
Vendors				
Tim	Kowalski	Wirtgen/Hamm	615-594-4604	tkowalski@Wirtgenamerica.com
Josh	Weston	Wirtgen/Hamm	615-693-9839	jweston@Wirtgenamerica.com
Dave	King	Caterpillar - Support	763.412.5553	King_David_A@cat.com
Todd	Mansell	Caterpillar - Support	763-447-5695	Mansell_Todd_W@cat.com
Steve	Ryan	Caterpillar	503-789-5332	Ryan_Steven_C@cat.comu
Mike	Mcmahon	SITECH-NW		mmcmahon@sitechnw.com
Garry	Aicken	Kessler (LWD-a)	703-989-6612	garry@kesslerdcp.com
Adam	Carmichael,	Infrasense (GPR)		
Paving Contractors				
Robert	Rasmussen	Granite Construction	360-815-7525	rob.rasmussen@gcinc.com
Bo	Smith	Granite Construction		Bo.Smith@gcinc.com
Chuck	Young	Granite Construction		
Paving Association				

Project webpage: (http://www.intelligentcompaction.com/projects/2012-2014-fhwa-hma/2014-field-projects/washington-state-ic-demo-2014/)

Main Contacts

- **FHWA IC project**: Dr. George Chang, FHWA IC team.
- **Field Visits**: Robert Rasmussen, Granite Construction
- **DOT Project Manager**: Patrick Fuller,WSDOT
- **Open House**: Patrick Fuller,WSDOT
- **Roller Shipment**: Shipping address: 9900 Guide Meridian Lynden, WA 98264.; Contacts: Robert Rasmussen, Granite Construction (360-815-7525); ETA: Saturday August 23

Responsibilities

FHWA IC Team

- IC training,
- Field data collection/analysis,
- Presentation during Open House.

DOT

- Personnel to be trained on IC,
- Coordination of the Open House event,
- Facility and AV for the Open House event,
- Arrangement for personnel and equipment for FWD test
- Arrangement for personnel and equipment (2+ rigs) for coring,
- Personnel and equipment for bulk density tests for cores.

Paving Contractor

- Personnel to be trained on IC,
- Two IC roller operators,
- Mobilization of IC rollers onsite and to Open House,
- One density gauge and an operator,
- Fuel and water for IC rollers.

Roller Vendors

- IC Training (esp. IC operation, data collection and transfer),
- Technical support during field demo,
- Presentation during Open House.

GPS Vendor

- GPS rover, base station, and an operator,
- GPS training,
- Technical support during field demo,
- Presentation during Open House.

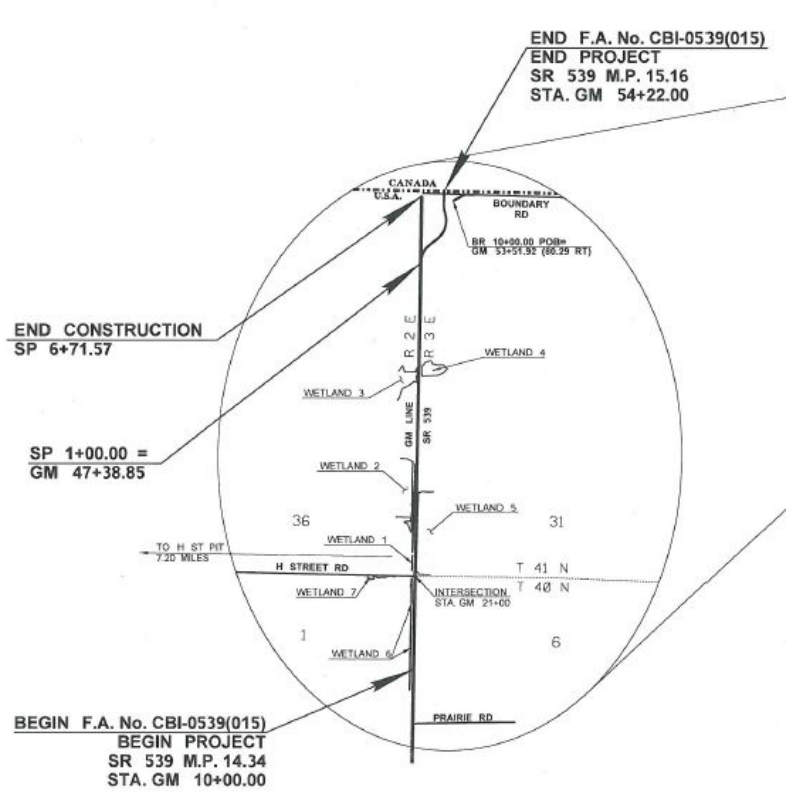
LWD-a Vendor

- Personnel and equipment for LWD tests.
- Presentation during Open House.

Site Map

This project is a day-time paving job located at SR 539 in Whatcom County, WA. The title of this project is “Lynden-Aldergrove Port of Entry Improvements” from SR 539 MP 14.34 to MP 15.16 (F.A. Project No. CBI-0539(015)).

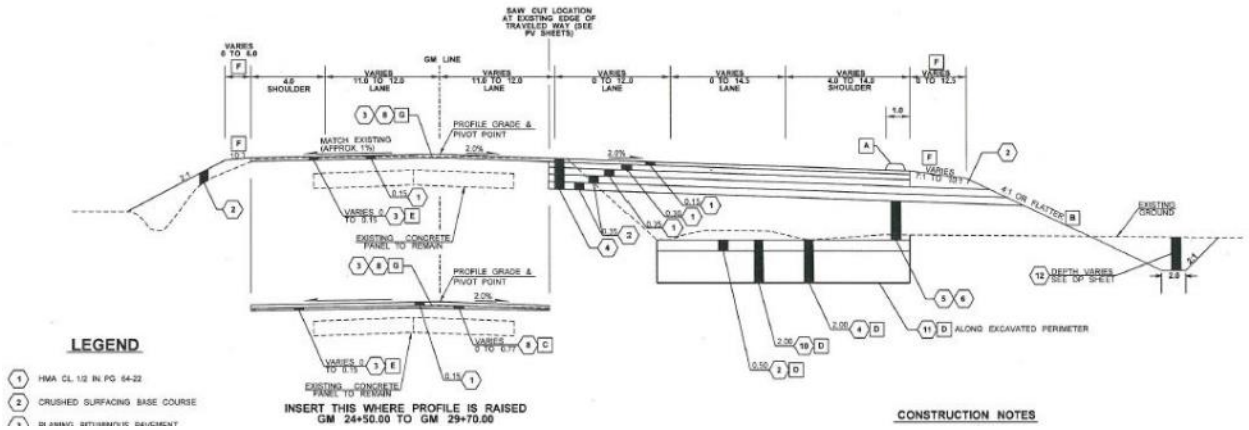
The project length is 3000 ft. The test sections will be at the two new lane construction areas on SR 539 adjacent to the border to Canada.



Pavement layers

The target layer construction for this FHWA IC study will be on the base course or intermediate of the asphalt layers.

A typical section design is as follows:



Onsite Safety

Contact Robert Rasmussen, Granite Construction (cellphone: 360-815-7525), for any onsite visits.

DOT and Contractor require all onsite participants to observe safety rules:

- Ingress and egress to and from the work zone, vehicles shall be equipped with yellow flashing lights.
- Location to park vehicles.
- Location for people to safely observe operations.
- Adequate PPE provided for all personnel within the work zone (hard hats, safety vests, working gloves, safety glasses, steel toed boots, and ear plugs etc.).
- Suggest carpool to the job site.

On-site Activities

Schedule	Activities
Day 0 Sunday (Aug 24)	• Conduct IC rollers/GPS setup and trial runs (equipment vendors and FHWA IC team only) at the staging area. (2PM-4PM) • Conduct project briefing at the staging area and IC training for roller operators (4PM-5PM).
Day 1 Monday (Aug 25)	• Conduct project and safety briefing at the staging area (5:30AM). • Set up the GPS base station and IC roller/GPS system (6AM). • Start paving with one IC roller at breakdown and another IC roller at intermediate position. • Select a 500-ft section as a test strip to establish the rolling pattern. Conduct NG/GPS/LWD-a testing immediately behind the paver and at selected locations after each breakdown and intermediate roller pass within the test strip. • Perform production compaction using the rolling pattern. • Conduct NG/GPS/LWD-a at selected locations after the finishing rolling
Day 2 Tuesday (Aug 26)	• Set up the GPS base station and IC roller/GPS system (by 6AM). • Start paving with one IC roller at breakdown and another IC roller at intermediate position. • Conduct NG/GPS/LWD-a testing immediately behind the paver and at selected locations after each breakdown roller pass within the 1500-ft section. • Conduct NG/GPS/LWD-a testing at selected locations after each intermediate roller pass within the 1500-ft section. • After the finishing rolling, mark 60 locations within the 1500-ft paved section. Conduct NG/GPS tests at marked locations. Conduct FWD, GPS and LWD-a tests at designated locations. Conduct GPR scanning. Conduct coring at the marked locations.
Day 3 Wednesday (Aug 27)	• Set up the GPS base station and IC roller/GPS system (by 6AM). • Start paving with one IC roller at breakdown and another IC roller at intermediate position. • Select a 500-ft section. Conduct NG/GPS/LWD-a testing immediately behind the paver and at selected locations after each breakdown and intermediate roller pass within the test strip. • Perform production compaction using the rolling pattern. • Conduct NG/GPS/LWD-a at selected locations after the finishing rolling.
Days 4 Thursday (Aug 28)	• Conduct the Open House event including presentation and equipment demonstration.

- GPS: Hand-held GPS rover and a base station will be provided by SITECH-NW.
- NG: Nuclear density gauge and an operator will be provided by the contractor.
- LWD-a: Lightweight deflectometer for asphalt tests will be provided by Kessler.
- FWD: Falling weight deflectometer and an operator will be provided by DOT.
- GPR: Ground Penetration RADAR and an operator will be provided by Infrasense.
- Coring: 60 X 4” cores will be taken with two coring rigs by DOT.

- Core tests: Bulk density testing of cores will be performed by DOT

Test Settings

Date	TB	Machine	Setting	Spot Tests	Notes/Comments
Day 1	1A	IC 1	0.3mm at 4000 vpm	NG, GPS, LWD-a	Breakdown compaction for asphalt base course. 1. Compact with normal roller passes. 2. NG/GPS/LWD-a tests after each roller pass at selected locations within the test section.
	1B	IC 2	Low amp at 4000 vpm	NG, GPS, LWD-a	Intermediate compaction for asphalt base course. 1. Compact with normal roller passes. 2. NG/GPS/LWD-a tests after each roller pass at selected locations within the test section.
	1C	Conventional Roller	Static	NA	Finishing rolling 1. Compact with normal roller passes.
Day 2	2A	IC 2	Low amp at 4000 vpm	NG, GPS, LWD-a	Breakdown compaction for asphalt base course. 1. Compact with normal roller passes. 2. NG/GPS LWD-a tests after each roller pass at selected locations within the test section.
	2B	IC 1	0.3mm at 4000 vpm	NG, GPS, LWD-a	Intermediate compaction for asphalt base course. 1. Compact with normal roller passes. 2. NG/GPS LWD-a tests after each roller pass at selected locations within the test section.
	2C	Conventional Roller	Static	NG, GPS, LWD-a, FWD Coring	Finishing rolling 1. Compact with normal roller passes. 2. NG/GPS/LWD-a/FWD/Coring tests after the finishing rolling at marked locations within the test section.
Day 3	3A	IC 1	0.3mm at 4000 vpm	NG, GPS, LWD-a	Breakdown compaction for asphalt base course. 1. Compact with normal roller passes. 2. NG/GPS LWD-a tests after each roller pass at selected locations within the test section.
	3B	IC 2	Low amp at 4000 vpm	NG, GPS, LWD-a	Intermediate compaction for asphalt base course. 1. Compact with normal roller passes. 2. NG/GPS LWD-a tests after each roller pass at selected locations within the test section.
	3C	Conventional Roller	Static	NA	Finishing rolling 1. Compact with normal roller passes.

Day 0 – IC Setup, Trial Runs, and GPS Validation

A GPS base station will be setup onsite (if applicable).

IC rollers will be fully setup and functioning.

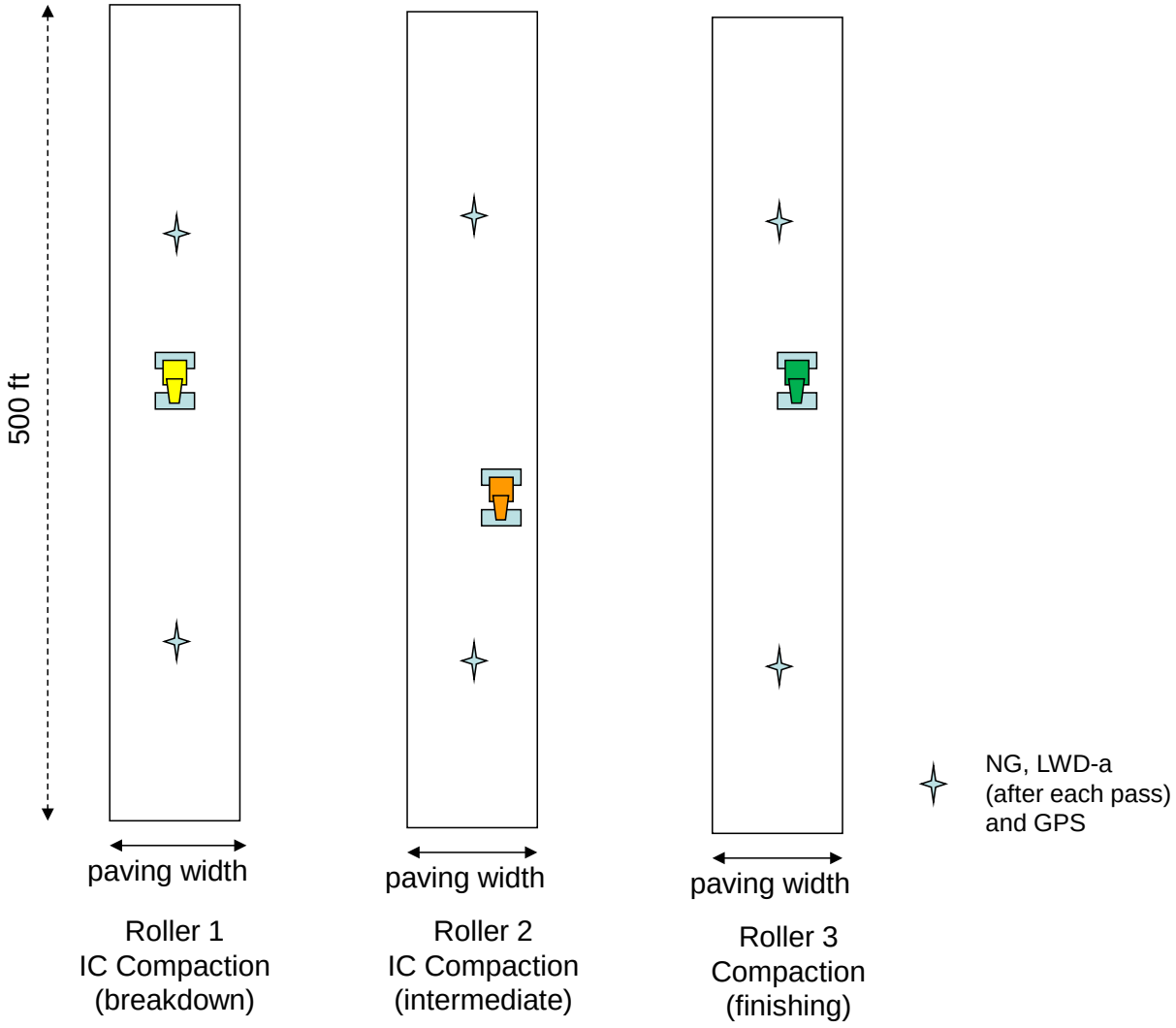
Brief trial runs in vibratory mode will be conducted with each IC roller.

Data files will exported from vendors' software or online solution and re-imported to Veda for checking.

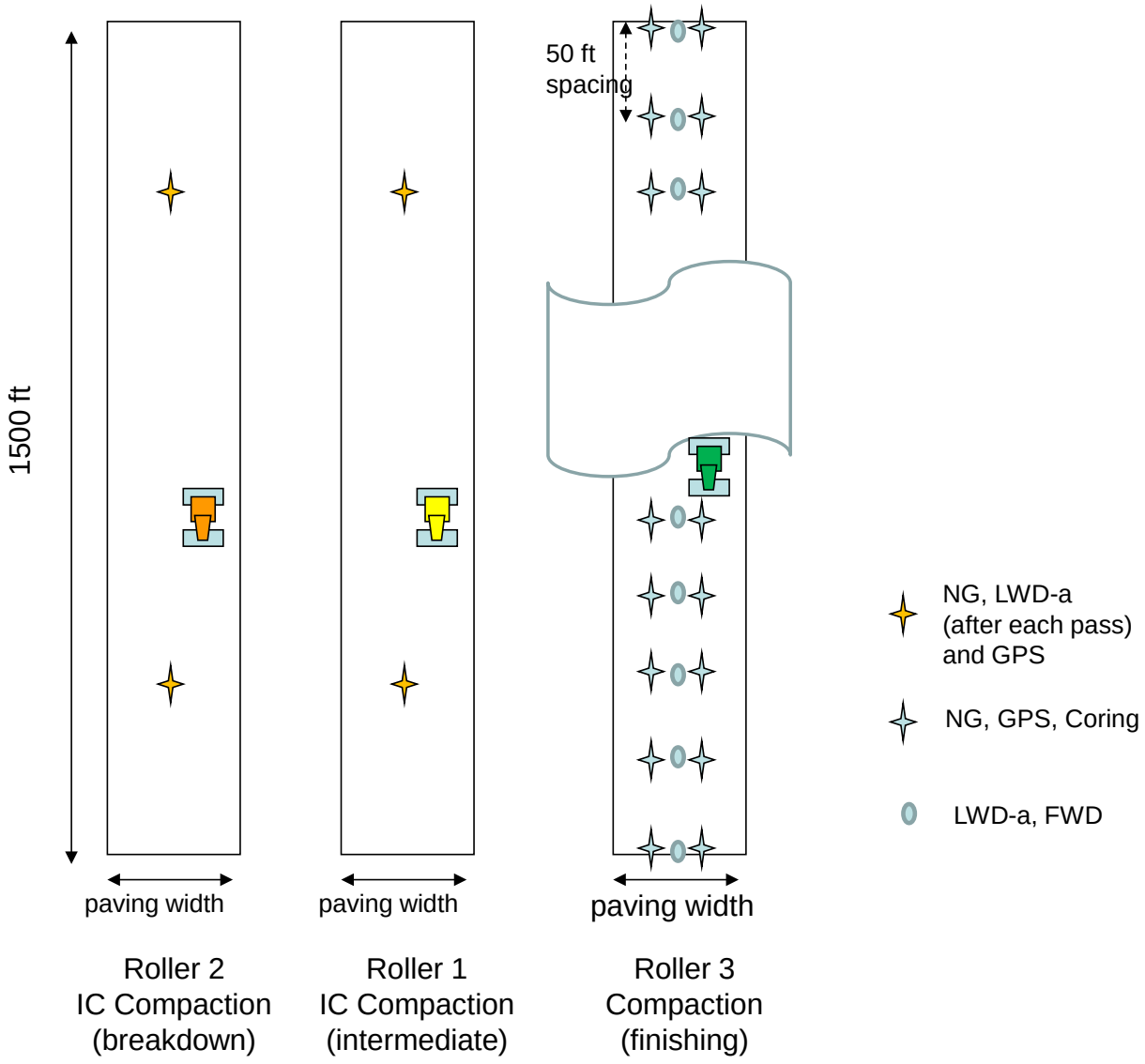
GPS Validation will be conducted via the following procedures:

1. Move the IC roller around until the GPS header computation is initialized.
2. Move the IC roller and park at a selected location.
3. Record the GPS measurements from the IC roller ensuring the distance offsets are applied so that the GPS coordinate is at the center or at left/right edges of the front drum.
4. Mark two locations on the ground adjacent to the right and left edges of the front drum contact patch.
5. Move the IC roller from the marked locations.
6. Use a hand-held rover to measure at the marked locations.
7. Average the rover GPS measurements if the roller GPS measurement is at the center of the front drum.
8. The differences between the roller GPS and rover measurements shall be within 12 inches (300 mm) for northing and easting.

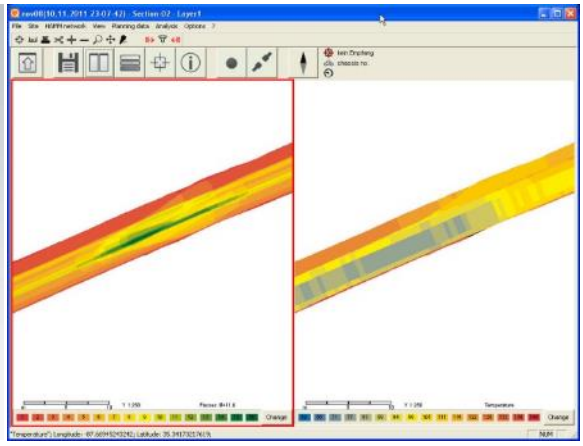
Day 1 & 3 – Test Sections



Day 2 – Test Section



HAMM Double-Drum IC Roller



Manufacturer/ Vendor	HAMM/Wirtgen
Model Name	HCQ (Hamm Compaction Quality)
Model Number	HD+ 140
Drum Width	84”
Machine Weight	Operating wt. 28,929 lbs. w/max of 31,509 lbs.
Amplitude Settings	High/Low - .03/.01 in.
Frequency Settings	Variable from 2700 - 4020 vpm
Auto-Feedback	NA
Measurement System	HAMM Compaction Quality (HCQ)
Measurement Value	HMV, density estimator, temperature, passes
Measurement Unit	[unitless, % compaction, °C, color coded]
GPS Capability	Yes
Documentation System	HCQ with ability to export to Veda
Contact	Tim Kowalski (615) 594-4604 tkowalski@Wirtgenamerica.com

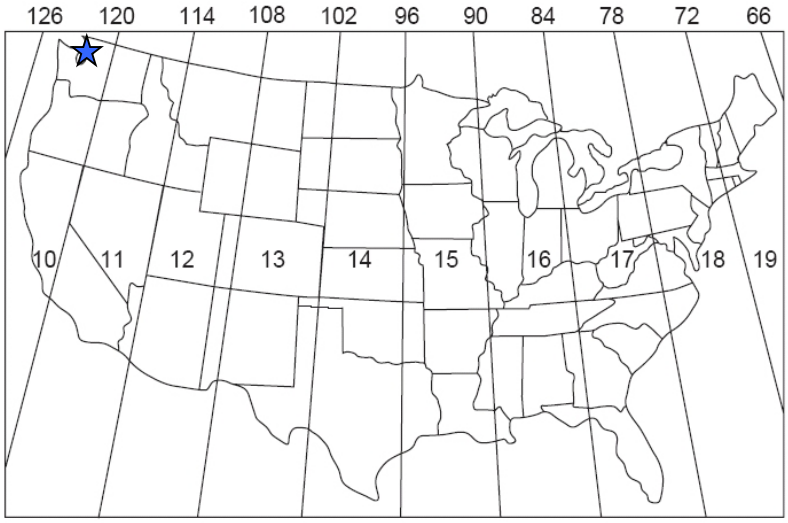
Caterpillar Double-Drum IC Roller

Manufacturer/ Vendor	Caterpillar
Model Name	Tandem vibratory rollers
Model Number	CB54XW
Drum Width	79"
Machine Weight	Operating wt. 26,230 lbs.
Amplitude Settings	0.034 – 0.012”
Frequency Settings	2,520 and 3,800 vpm
Auto-Feedback	NA
Measurement System	Compaction Meter Value (CMV)
Measurement Value	CMV
Measurement Unit	[unitless]
GPS Capability	Yes
Documentation System	VisionLink
Contact	Todd Mansell, 763-447-5695, Mansell_Todd_W@cat.com Dave King, 763-412-5553, King_David_A@cat.com

Global Positioning System (GPS)

Grid Reference

UTM-10N is the preferred coordinate reference for all devices.



Trimble GPS

- A Trimble GPS receiver and a radio will be mounted on the Caterpillar IC roller.
- A Trimble GPS base station will be setup to provide RTK correction signals.
- A hand-held Trimble GPS rover will be used for in-situ point measurements.

OmniSTAR GPS

- A GPS receiver with OmniSTAR subscription will be mounted on the HAMM IC roller.

Open House

Time: Thursday, 8AM to noon, Aug 28, 2014

Location: WSDOT Maintenance Office - 3920 Airport Way, Bellingham, WA 98226

Contact: Patrick Fuller, WSDOT, 206-941-0784, FULLEP@wsdot.wa.gov

Agenda

- **Session 1** - 8:00AM to 11:00AM - Indoor Presentation
- **Session 2** - 11:00AM to noon – Outdoor Equipment Demonstration (IC rollers, LWD-a and GPS)

Online Registration is required:

Webpage (https:// fhwaicopenhousewa.eventbrite.com/)