

Welcome

*The Year-End Presentation for the
National Transportation Career
Pathways Initiative will begin shortly ...*



- ❑ If your computer has no audio, call-in using (646) 876-9923, ID 752 834 603.
- ❑ For unexpected challenges, please call or text (323) 512-1852.
- ❑ Be sure to mute all background sounds and place unused phones on “DND”.
- ❑ During the presentation, all mics will be muted except for the current speaker.
- ❑ Our team is monitoring Zoom Chat. If an issue comes up during the presentation, please alert us via your Chat Box.



National Transportation Career Pathways Initiative

YEAR-END PRESENTATION

March 16, 2018 ■ 1:00pm - 3:00pm (EST)

NTCPI Principal Investigator

Southwest Transportation Workforce Center
California State University, Long Beach



Thomas O'Brien
Director

Today's Agenda



- 1:00pm Welcome & Introductions
(Framing the Initiative)
- 1:10pm Common Methodologies
(Approaching the Research)
- 1:20pm Priority Occupations & Pathways
(The Disciplinary Outcomes)
- 2:35pm Year-Two Objectives
(Bringing it all Together)
- 2:45pm Beyond the Initiative
(Sensible Next Steps)
- 2:50pm Feedback & Recommendations
(Producing Useful Outcomes)



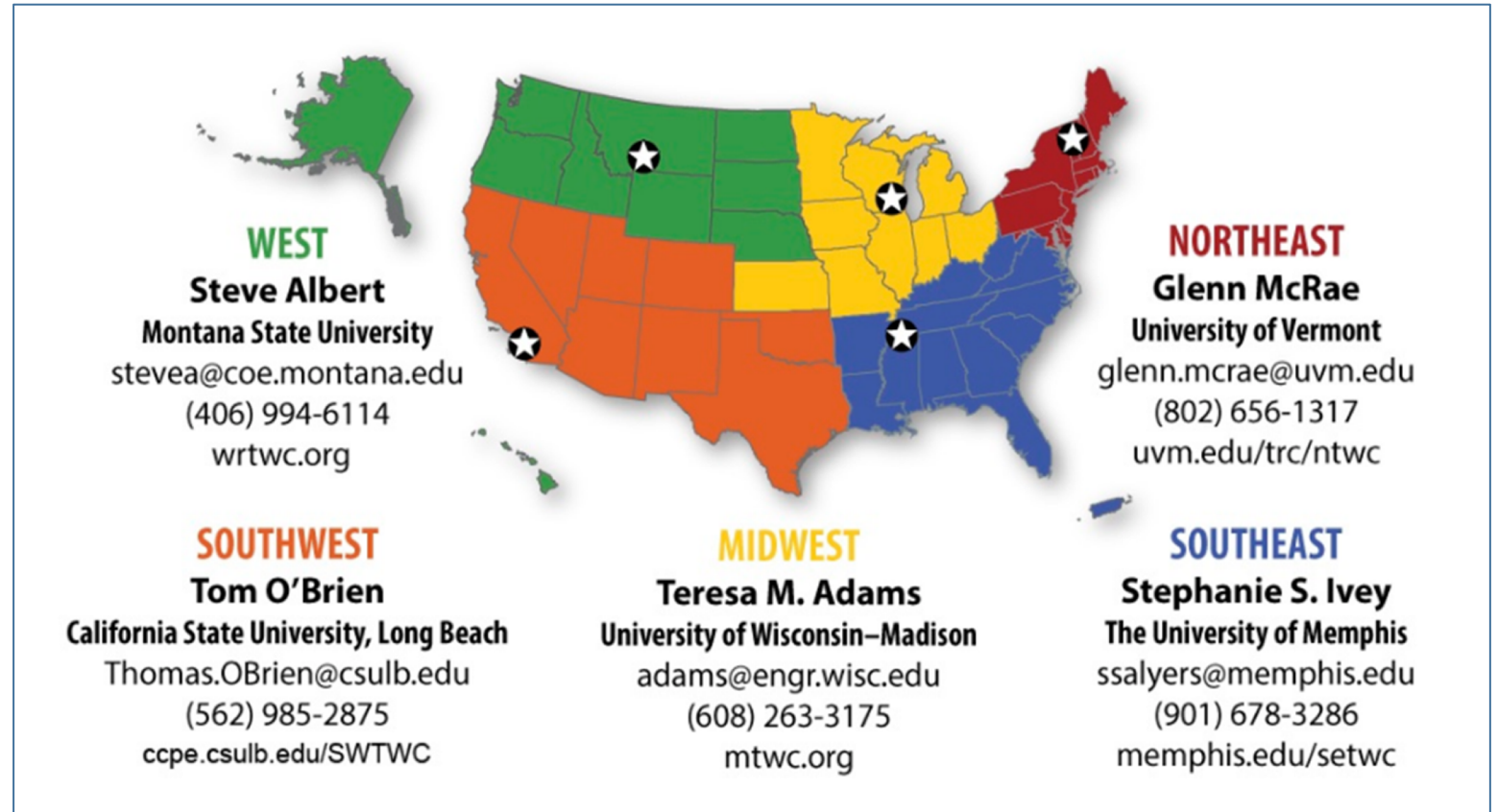
Welcome & Introductions

Framing the Initiative

The NNTW Story

“FHWA established five Regional Transportation Workforce Centers that work together to provide a more strategic and efficient approach to transportation workforce development. The Centers act together to facilitate national partnerships with key public and private organizations throughout the transportation, education, labor and workforce investment communities to identify and promote effective transportation workforce activities and programs.” (nntw.org)

National Network for the Transportation Workforce



The NNTW is ...

- A consortium of five regional transportation workforce centers
- Working in collaboration with FHWA Center for Workforce Development
- Providing nationwide, university-based research for FHWA projects
- Dedicated to the development of the transportation workforce
- Establishing more effective/cohesive transportation career pathways



The Career Pathway Initiative

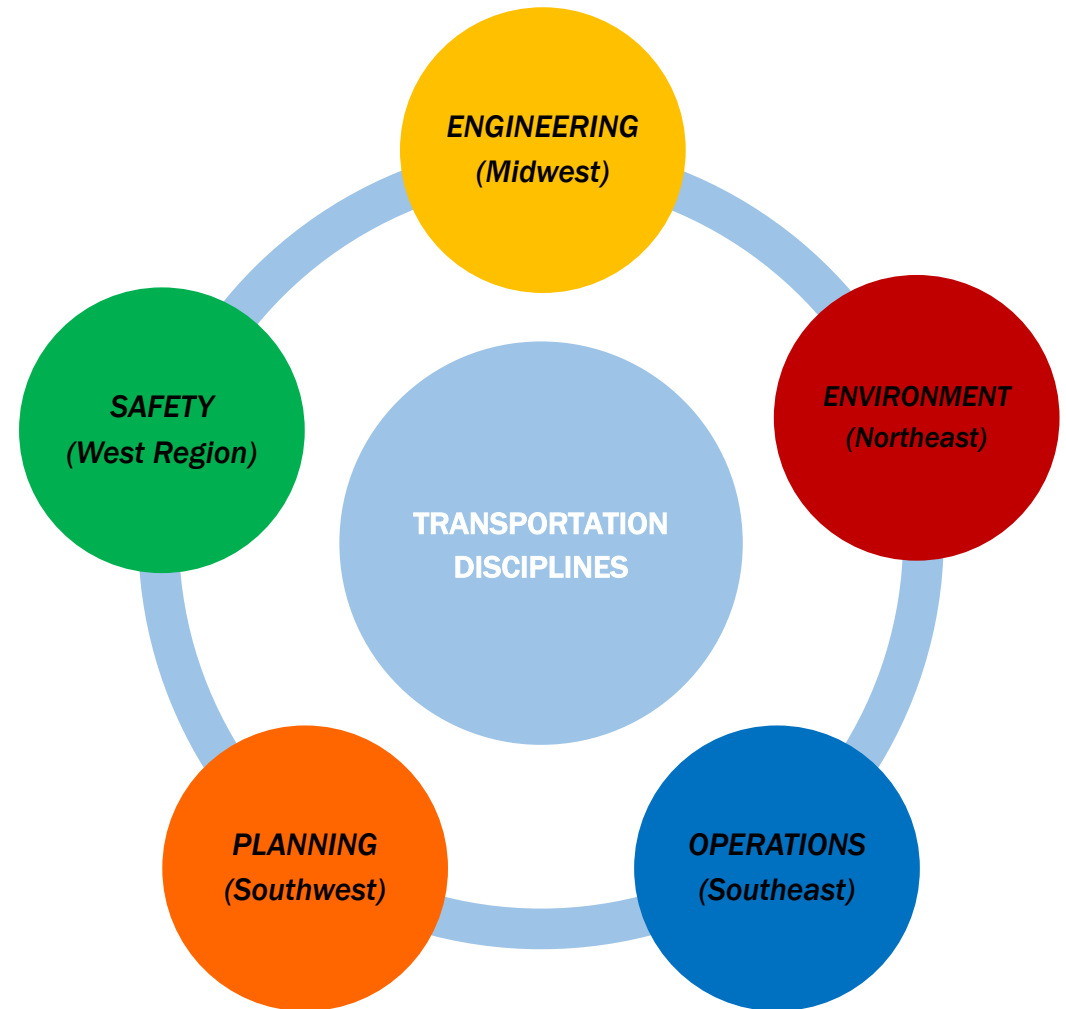
- Aligns with strategic objectives of US DOT performance plan
- Addresses economic competitiveness thru creation of a dynamic workforce
- Identifies/advances CTE pathways that support transportation jobs
- Addresses STEM and transportation-related academics for K-16 students
- Improves pathways into transportation occupations for all populations

“The objective of the NTCPI program is to establish, document, and validate the knowledge, skills, abilities, and career pathways for the top occupations within the transportation Planning, Environment, Engineering, Safety, and Operations disciplines, as forecast over the next 15 years.”

(FHWA)

Project Objectives

1. Form Discipline Working Groups, build broader stakeholder network
2. Identify priority occupations (5-15yrs), determine in-demand skillsets
3. Assess state of education, training & experiential learning programs
4. Identify skills/training gaps; impacts due to transformative technologies
5. Design career pathways for priority occupations (post-secondary)
6. Document implementation plans; demonstrate Planning pathway



The NTCPI Vision



“Inspire students to pursue critical, in-demand transportation occupations by building a network of industry and academic professionals who represent this future workforce; a network that supports education and training institutions in equipping students with the skills, competencies, and experiences necessary to succeed in a transportation career.”

(NTCPI DWG Charter)



Common Methodologies

Approaching the Research

It's a Question of Research

1. What's unique about these five disciplines ... and what's common?
2. Who is a transportation professional (and how did they get there)?
3. What's the value ... and constraints ... of current LMI systems?
4. What barriers exist within the academic institutional framework?
5. Can we promote greater 2-year to 4-year academic connections?
6. Who is the audience for these nationalized career pathways?
7. Can transformative technologies forecast workplace change?
8. How can the Planning Demo inform our implementation plans?

It's a Matter of Partnerships

How do we engage and convene academic and industry stakeholders to steer and advance initiative outcomes?

It all starts with partnerships ...



The Power of Engagement



The University of Vermont



Maryland Department of Transportation





Priority Occupations & Pathways

The Disciplinary Outcomes

Operations Discipline

Southeast Transportation Workforce Center

University of Memphis, Tennessee



Stephanie Ivey

Director

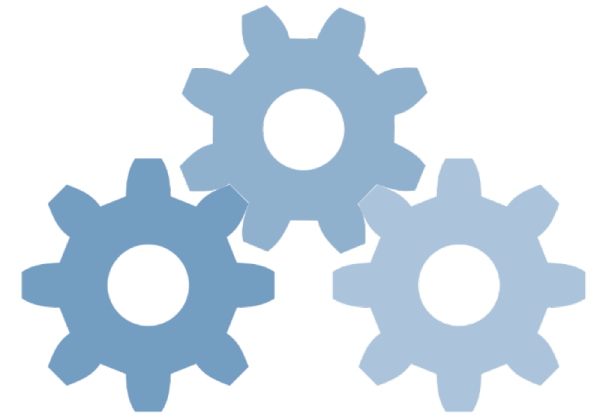
Operations

Our Focus

- Addressing “*tunnel vision*”
- Develop occupational examples and role models from the outset
- Better define competencies and expectations and align with curricular offerings
- Traffic – Transit – Freight
- Lateral mobility across areas

Key Challenges & Opportunities

- Occupations are poorly defined
- Rapid pace of technological changes
- Unclear pathways for progression



Operations

State of Practice

- Opportunities in operations are varied, with multiple entry points
- Occupations: Technical vs. Professional
 - *What's the same?*
 - *What's different?*
- The Gaps: Approaching Transportation Operations as a discipline!



Operations

Priority Occupations

TRAFFIC	TRANSIT	FREIGHT
Project & Program Mangers	Project & Program Managers	Project & Program Managers
Computer & Information Systems Managers / Cyber Security	Computer & Information Systems Managers / Cyber Security	Computer & Information Systems Managers / Cyber Security
Operations Planners	Operations Planners	Operations Planners
Traffic Signal / Maint. Technicians	Commercial Drivers	Commercial Drivers
Traffic Incident / Ops Center Mgrs	Diesel Mechanics	Diesel Mechanics
Civil / Traffic Engineers	Civil / Transportation Engineers	Data Science Analyst / Logisticians
ITS Technicians		Ind. Eng. / Ops Research Analysts

Traffic Operations Pathway: Traffic Signal/ITS Technicians

	KSAs	ACADEMIC PROGRAM OF STUDY	INDUSTRY CERTIFICATION	JOBS & WAGES
ADVANCED LEVEL	<p>Knowledge of Transportation and Traffic Engineering/Operations</p> <p>Knowledge of ITS Technology and Operations</p> <p>Knowledge of Local Agency Procedures/ Standard Design Principles</p> <p>Knowledge of Traffic Control Devices</p> <p>Communication Skills, Written and Verbal</p> <p>Interpersonal Skills</p> <p>Managerial or Supervisory Experience and Leadership Skills</p> <p>Knowledge of Microsoft Office Programs</p>	<div> <p>Bachelor's degree required</p> <p><i>Major coursework in Civil or Electrical Engineering with experience in ITS planning, design, or implementation</i></p> </div> <div> <p>3-9 years experience in ITS supervisory/ management position (education may count toward experience)</p> </div>	<p><input type="checkbox"/> Professional Engineering License</p> <p><input type="checkbox"/> Safety Impact Certificate</p>	<p>Advanced Level</p> <p>Traffic System Supervisor</p> <ul style="list-style-type: none"> Traffic Devices Certification Traffic Systems Supervisor Traffic Signal/ITS Engineer <p>\$23.44 (mean hourly rate from job descriptions)</p>
				<p>Intermediate Level</p> <p>ITS Technician \$18.51</p> <ul style="list-style-type: none"> ITS Field Technician ITS Locator Traffic Signal/ ITS Technician <p>Traffic Systems/ Signal Technician II</p> <p>\$19.85 (mean hourly rate from job descriptions)</p>
MID LEVEL	<p>Knowledge of ITS Technology and Operations</p> <p>Knowledge of the Electrical Trade</p> <p>Knowledge of Traffic Control Devices</p> <p>Management of Labor, Tools, or Materials</p> <p>Ability to read and interpret diagrams, schematics, blueprints, etc.</p> <p>Analytical, Mathematical, or Problem-solving Skills</p> <p>Communication Skills, Written and Verbal</p> <p>General Computer Skills</p>	<div> <p>Some additional training required (technical, vocational, or college level)</p> <p>Associate's degree sometimes required</p> <p><i>Major coursework in Electronics, Electrical Engineering, Engineering Technology, Computer Technology</i></p> </div> <div> <p>5-8 years experience as electrician or traffic signal technician (construction experience is also sometimes applicable)</p> </div>	<p><input type="checkbox"/> IMSA Traffic Signal Level II</p> <p><input type="checkbox"/> Networking Certifications</p> <p><input type="checkbox"/> BICSI Certifications</p> <p><input type="checkbox"/> Fiber Certifications</p> <p><input type="checkbox"/> Wireless Certifications</p> <p><input type="checkbox"/> Comtrain Tower Climbing Certification</p>	
ENTRY LEVEL	<p>Knowledge of Traffic Control Devices</p> <p>Knowledge of the Electrical Trade</p> <p>Operation of relevant equipment/machinery</p> <p>Communication, Written and Verbal</p> <p>Ability to follow/interpret instructions</p> <p>Interpersonal Skills</p> <p>Ability to read and interpret diagrams, schematics, blueprints, etc.</p> <p>General Computer skills</p>	<div> <p>High School Diploma or GED required</p> <p>Some additional training required (vocational, technical, or college level coursework)</p> <p><i>Major coursework in Electronics or related field)</i></p> </div> <div> <p>1-5 years experience with installation, maintenance, and repair of traffic signals or related system (education may count as experience)</p> </div>	<p><input type="checkbox"/> Driver's License with a good driving record</p> <p><input type="checkbox"/> Commercial Driver's License (Class A, B, or C with airbrake endorsements)</p> <p><input type="checkbox"/> IMSA Traffic Signal Level I, II, or III</p> <p><input type="checkbox"/> Work Zone Traffic Control</p> <p><input type="checkbox"/> Electrician Certification</p>	<p>Entry Level</p> <p>Traffic Systems Signal Technician I</p> <ul style="list-style-type: none"> Traffic Signal Installer <p>\$18.64 (mean hourly rate from job descriptions)</p>

Summary

- *Key challenge: defining the discipline and making it visible*
- *Pathway and workforce efforts cannot begin at post-secondary – K12 initiatives are essential!*
- *Industry and academia partnerships are critical*

[illegible]

Environment Discipline

Northeast Transportation Workforce Center

University of Vermont, Burlington

in partnership with CAIT at Rutgers



Glenn McRae
Director

Environment

“Environment” is Interdisciplinary by Nature

Anticipate Future Job Needs & Growth

- Examine key documents/programs addressing environmental transportation outcomes, e.g., Beyond Traffic 2045 & the USDOT Smart Cities Challenge.
- Document investments in transportation-related infrastructure, programs, and hiring staff in areas related to environmental outcomes, e.g., Smart Cities, ITS for Roads & Transit, Sustainability Initiatives, Shared-Use Mobility Systems.

Efficiency & Environmental Outcomes Connect to Future Job Growth & New Emerging Competencies/Fields through Rapid Increases in:

- Transit, biking, walking and mobility on demand
- Hybrid and electric vehicles and the infrastructure that supports them
- Data and monitoring systems to increase system resilience and growth especially in light of climate change
- Coordination of land-use policy, transportation systems planning, investment

Environment Topics

[fhwa.dot.gov/environment](https://www.fhwa.dot.gov/environment)

Air Quality
Alternative Fuel Corridors
Bicycle & Pedestrian
Brownfields
Environmental Justice
Exemplary Human
Environment Initiatives
Livability Initiative
Noise
Recreational Trails Program
Safe Routes to School
Smart Growth
Sustainability
Traffic Calming
Transportation Alternatives
Criticr Crossings
Context Sensitive Solutions
Historic Preservation

Environment

Who Works in this Discipline?

- State of Practice: Wildlife Biologists to Regulatory Analysts to Air Quality Technicians to Material Scientists
- Steady-State Need from Standard Environmental Science Education Tracks
- Emerging Practice—Technicians to Leaders: Sustainability Managers to ITS Technicians to Shared Mobility Operations Managers to Bike Mechanics
- Rapidly emerging job classifications with expanded or new required KSAs

Education & Experience as Pathway Markers

The [National Center for Science and the Environment](#) survey of interdisciplinary environmental post secondary programs documented continuous growth in the number of programs and the recent addition of new programs in environmental and sustainability systems design.

[Sustainability Connect](#) (Arizona State University School of Sustainability) is a platform for applied projects in sustainability problem solving with public and private community partners, optimizing opportunities offered to students and faculty through a structured internship or capstone process.

[Heinz College at Carnegie Mellon University](#) in Pittsburgh, PA, has a professional master's degree program that combines with experiential learning such as Traffic21, Metro21 and LARC to train students and set them up for success in the smart city field. All of the 78 smart city challenge applicants forged education partnerships to meet anticipated new employee needs, skills and competencies.

What's Next – What to Prioritize?

Interdisciplinary Science ----- Long-Term Investments w/ Diverse Backing ----- Transportation Futures Vision

Environment

The New Mobility

- Smart City Challenge
- Shared Mobility expansion
- ITS/Smart City/Shared Mobility systems investments at the municipal level

Interdisciplinary

- Planning, Engineering, Operations, Safety ...

Meeting Multiple Goals

- Safety & Equity
- Economic Resilience
- Efficient Governance & Increased Participation
- Environmental Sustainability

Priority Occupations

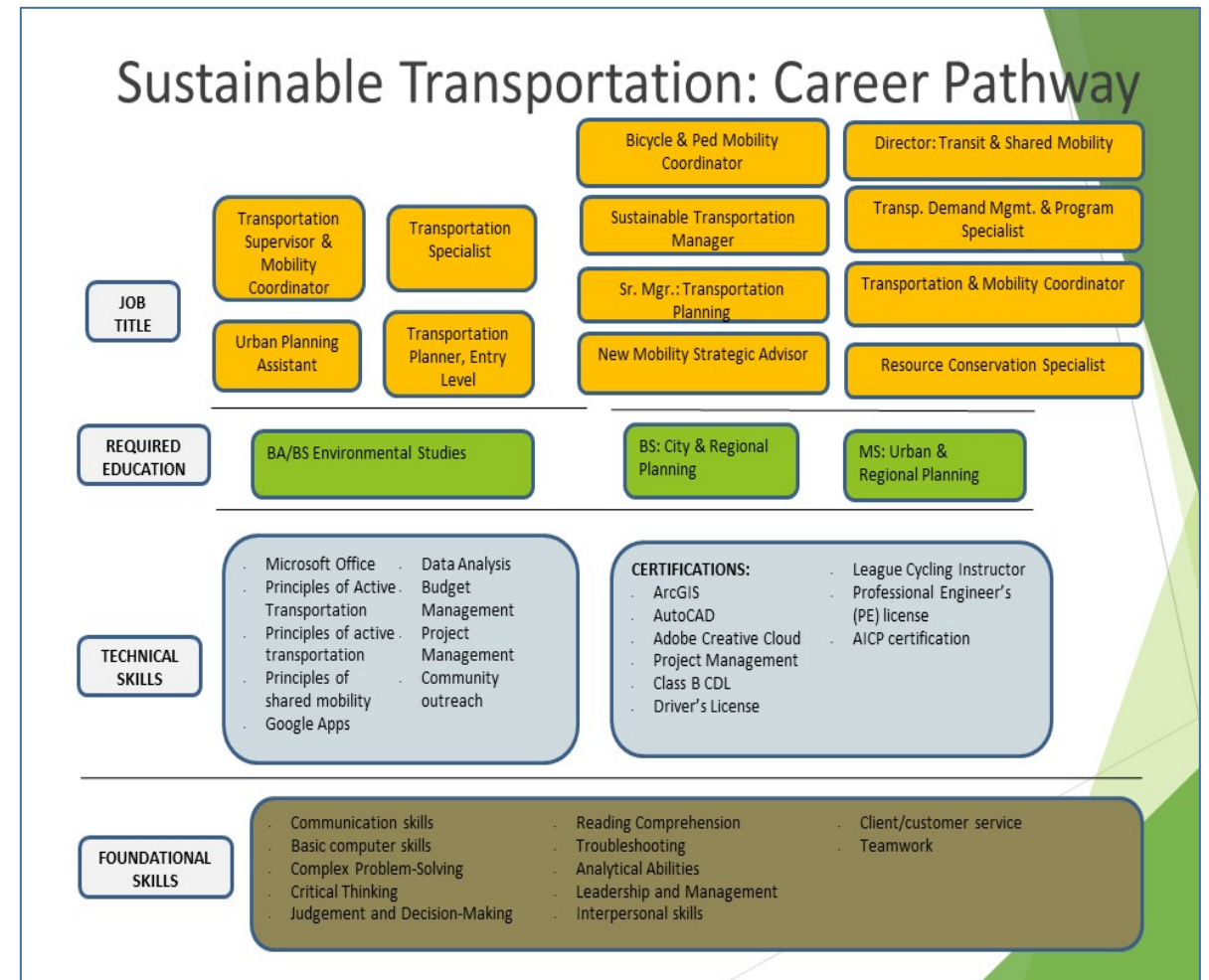
SUSTAINABLE TRANSPORTATION PLANNER / MANAGER	SMART CITY / EV INFRASTRUCTURE	SHARED MOBILITY / BIKE SHARE OPERATIONS	SMART CITY / ITS TECHS / ENGINEERS
Director of Transit & Shared Mobility Mobility Strategic Advisor Transportation Supervisor & Mobility Coordinator Transportation Demand Mgmt. & Program Specialist Transportation & Mobility Coordinator Urban Planning Assistant Senior Manager, Transportation Planning Transportation Specialist Special Projects Manager Sustainable Transportation Bicycle / Pedestrian Mobility Coordinator Transportation Planner Resource Conservation	Smart City Network Architect Infrastructure Architect, Information Systems Specialist Regional Manager, Smart Cities & Connected Vehicles Project Manager, Clean Transportation Project Manager, EV Charging & Infrastructure Operations Engineering Associate Project Engineer, Charging Infrastructure	Bike Share Operations Coordinator Bike Share Operations Manager Bike Share Operations Specialist Bike Share Operations Supervisor Asst. Field Operations Manager Community Coordinator Project Manager	ITS Technician ITS Engineer Traffic / ITS Engineer Senior ITS Engineer Smart Mobility ITS Engineer Senior Traffic Engineer, ITS Transportation Engineer Connected & Autonomous Systems Engineer ITS Manager, Public Transportation ITS Traffic Engineer

“Environmental goals are not achieved independent of other priority community goals.”

Environment

Career Pathways

- **Entry Points** along the educational continuum; retraining opportunities for incumbent workers.
- **Demand** generated in municipal departments, planning agencies, consulting groups, transit agencies, and private mobility companies.
- **Preparation** opportunities are expanding rapidly in the emergence of new academic programs, partnerships between academia and employers, and engagement of academia in the build out of transportation futures (e.g., Smart City).



Environment

Summary

- *Transportation career paths are increasingly interdisciplinary.*
- *Environmental fields cannot be easily separated from other disciplinary tracks.*
- *New mobility systems and technologies are rapidly emerging that are setting the stage of rapid advances in more environmentally sound & equitable transportation systems.*
- *Post-secondary programming and workforce training are struggling to keep up.*
- *Transportation, while acknowledged to be a significant factor in community environmental quality, is still under-represented as a field in sustainability and environmental programming, and identified career tracks.*

Safety Discipline

West Region Transportation Workforce Center

Montana State University, Bozeman

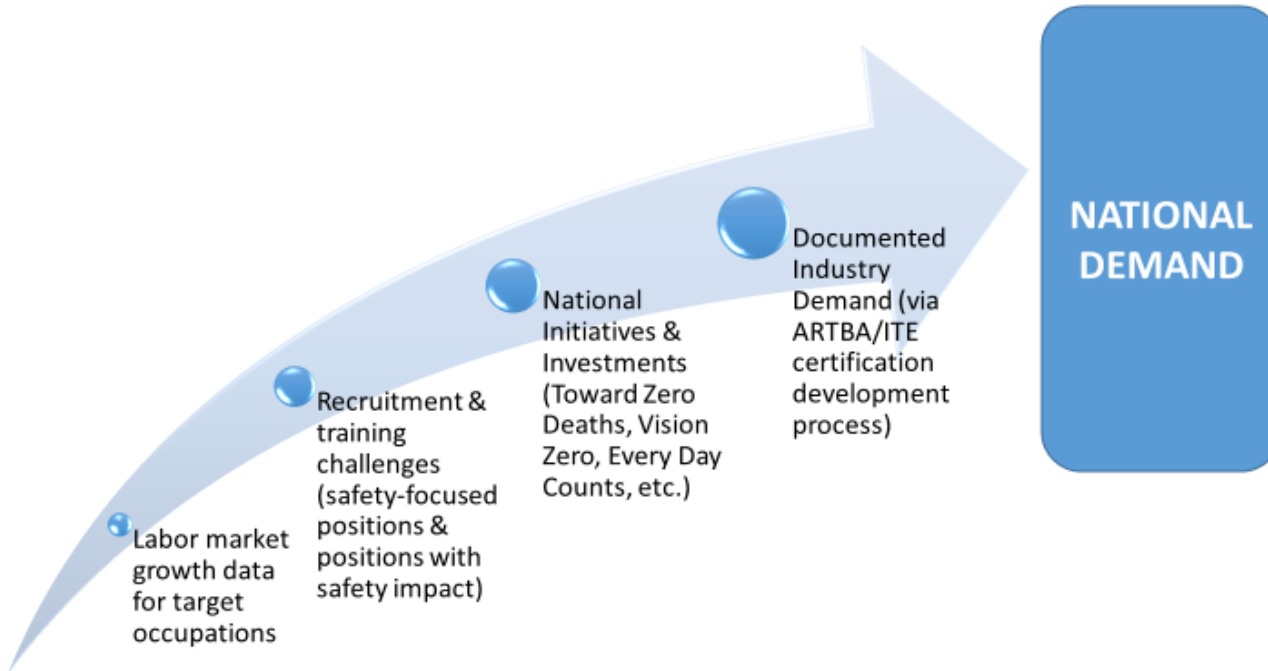


Steve Albert
Director

Safety

Our Approach

Target occupations that impact the safety performance of surface transportation systems through the design, construction, maintenance, and operation of roads and highways.



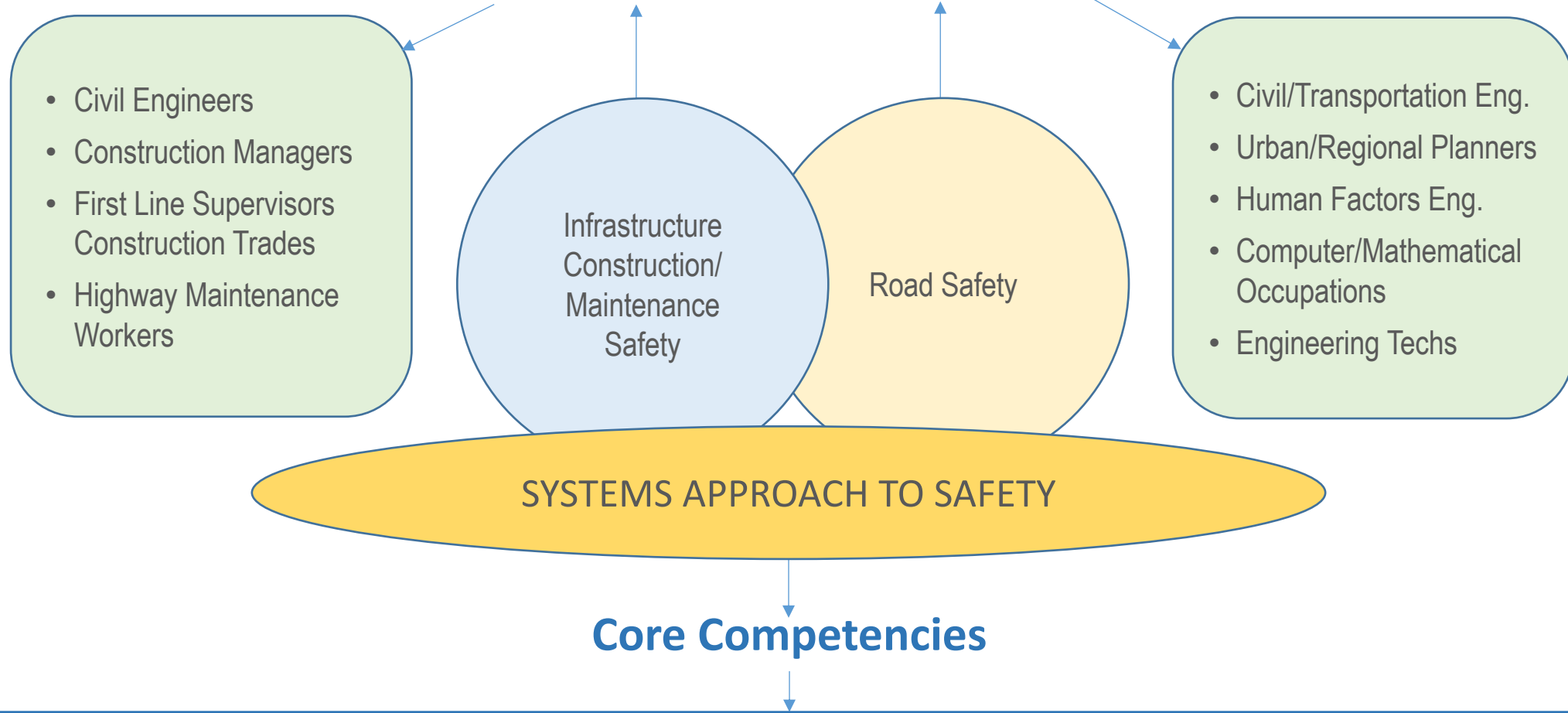
Challenges

- No career ladder = no demand = no supply
- “Highway Safety Engineer” may be one position within an organization, but safety competencies need to be integrated into job roles and responsibilities organization-wide.
- Safety Competencies are interdisciplinary; hiring practices and degree programs tend not to be.
- Emerging technologies demand more advanced computational and data analysis skills; OJT inadequate for building specialized knowledge.

Opportunities

- Increasingly robust professional development and certification programs.
- Mechanisms for industry-led experiential learning & safety recognition for career advancement.

Critical Safety Occupations



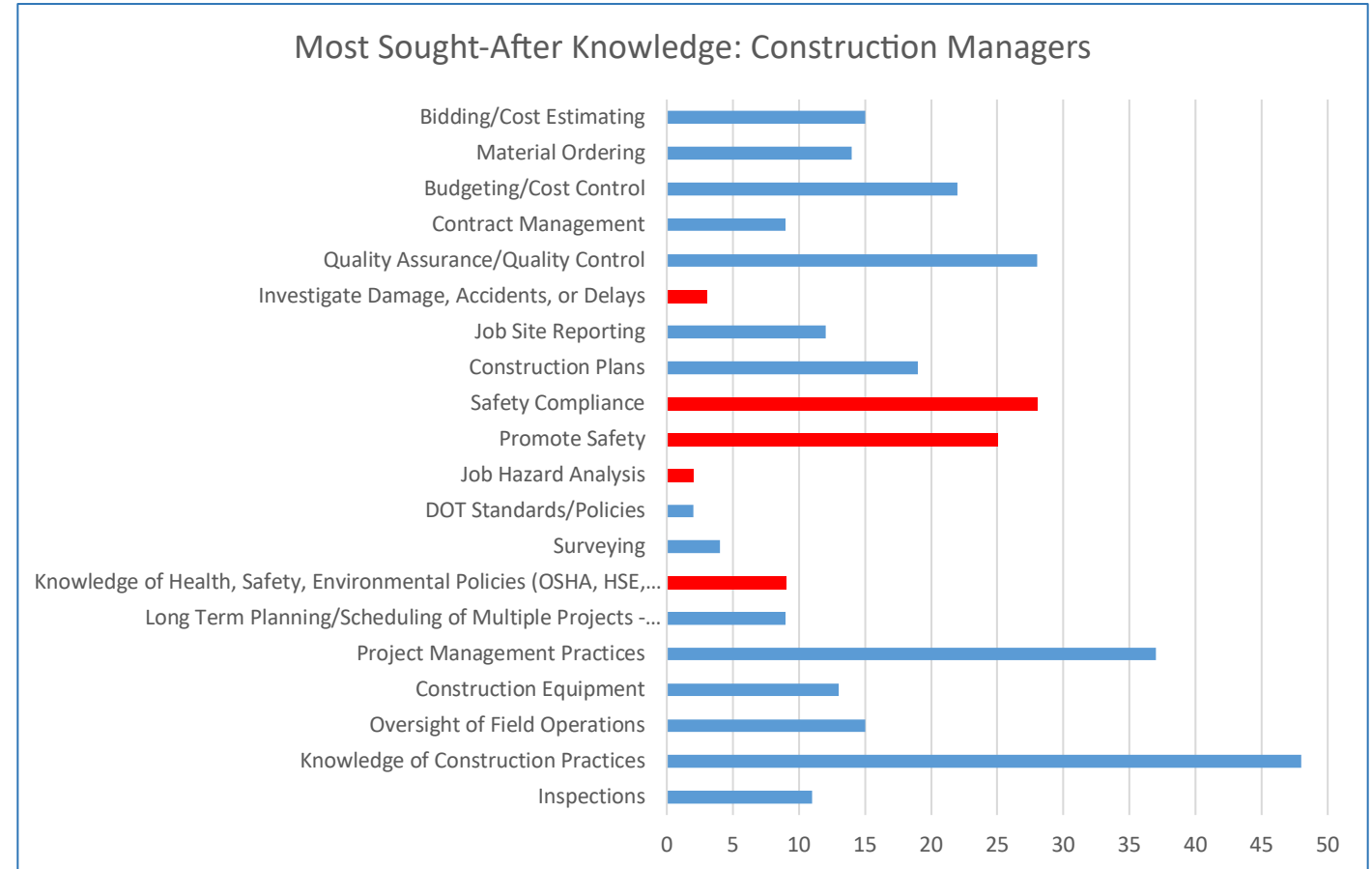
Awareness of Importance of Safety; Understanding Safety Management Principles & Safety Planning Process; Ability to Identify/Apply Regulatory Reqs; Ability to Identify/Assess Safety Risks & Deploy Appropriate Countermeasures to Mitigate Risks; Ability to Assess Effectiveness of Safety Measures; to Develop Safety Plans; Communicate w/ Multiple Stakeholders & Lead Change; Recognize Limitations of Road Users re: Behavior Choices & Reactions.

Safety

State of Practice

- Difficulty in identifying “safety” occupations in either job titles or job description requirements
- Current reliance on professional development or OJT for safety skillset development
- Difficulty with degree program content enhancements

Real Time Job Postings Data – Burning Glass



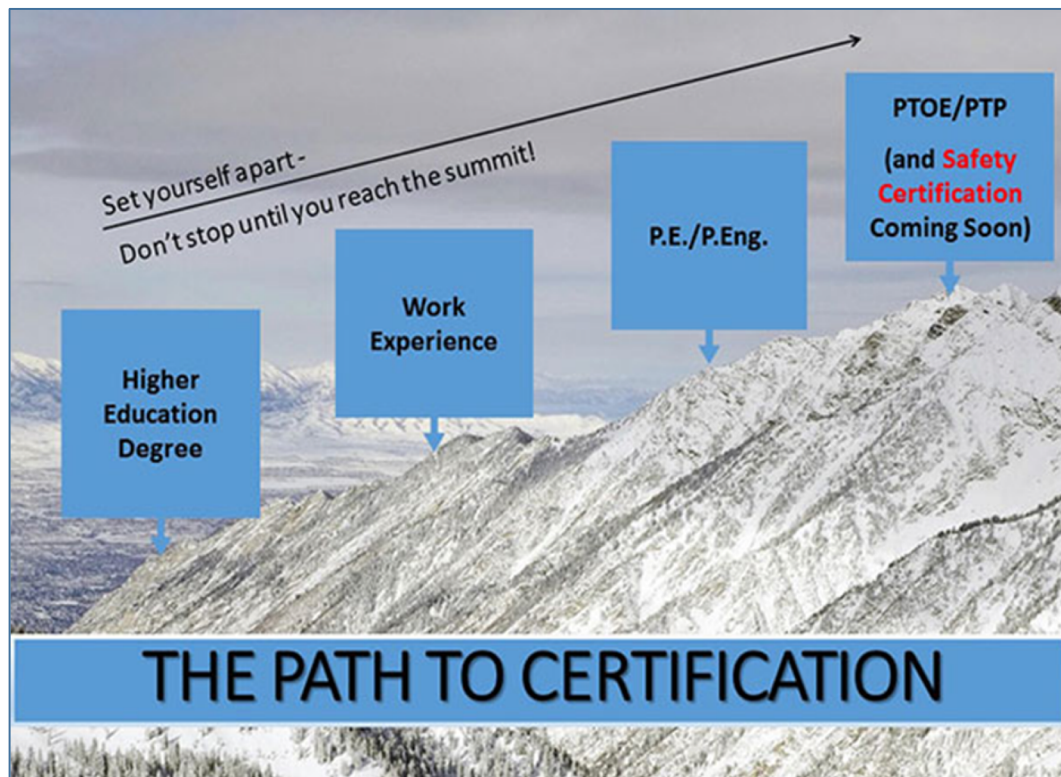
Road Safety Career Pathway

	Safety KSAs	ACADEMIC PROGRAM OF STUDY	INDUSTRY CERTIFICATION	JOB & WAGES
ADVANCED LEVEL	<p>Prioritize safety measures and performance outcomes and be able to communicate and collaborate with multiple stakeholders and the public to lead and navigate change.</p> <p>Utilize strategies to integrate safety data analysis into transportation decision-making processes and the planning, implementing, and evaluating of road safety programs.</p> <p>Understand the complex interaction of different crash contributing factors and their safety impacts on road users and their behaviors.</p> <p>Possess knowledge of advanced analytical and computational tools and techniques; be able to develop new models and analytical techniques to advance safety outcomes.</p>		<ul style="list-style-type: none"> <input type="checkbox"/> Masters/PhD <input type="checkbox"/> PE <input type="checkbox"/> PTOE <input type="checkbox"/> PTP, AICP <input type="checkbox"/> Road Safety Professional Certification Level II (coming soon...) 	Advanced Level
				<p>Research or Computer Analyst: \$50.48/hour</p> <p>Senior Highway or Safety Engineer: \$48.56/hour</p> <p>Senior Human Factors Engineer: \$46.68</p> <p>Project Engineer – Roadway Design: \$41.82/hour</p> <p>Senior Transportation Planner: \$41.35</p>
MID LEVEL	<p>Understand principles of transportation systems safety and importance of incorporating safety outcomes into decision making processes.</p> <p>Knowledge of, or ability to locate, use, and interpret various data and information sources, and analytical tools to: Identify and assess safety risks; Identify appropriate countermeasures to mitigate risks; and Assess effectiveness of safety measures.</p> <p>Ability to recognize the capabilities and limitations of road users in terms of behavior choices, reactions to road systems, and the capacity to survive a crash.</p>		<ul style="list-style-type: none"> <input type="checkbox"/> Bachelors degree <input type="checkbox"/> EIT/PE <input type="checkbox"/> PTOE <input type="checkbox"/> PTP, AICP <input type="checkbox"/> Road Safety Professional certification Level I (coming soon...) 	Intermediate Level
				<p>GIS Analyst: \$41.59/hour</p> <p>Human Factors Engineer: \$40.53/hour</p> <p>Civil Engineer/Transportation Engineer: \$40.16/hour</p> <p>Data Analyst: \$38.08/hour</p> <p>Assistant/Associate Transportation Planner: \$37.03</p> <p>Statistician: \$36.54/hour</p>
ENTRY LEVEL	<p>Understand road safety as a complex, interdisciplinary, multimodal discipline devoted to the avoidance and/or mitigation of fatalities, injuries, and crashes.</p> <p>Understand the importance of safety and be aware of safety policies, legislation, and organizational goals;</p> <p>Demonstrate knowledge of correct traffic control techniques and how to manage risk in the field;</p> <p>Design or prepare graphic/visual representations of spatial data, using GIS hardware or other software applications.</p>		<ul style="list-style-type: none"> <input type="checkbox"/> IMSA Certifications <input type="checkbox"/> Work Zone Safety Certifications <input type="checkbox"/> Valid driver's license <input type="checkbox"/> CDL 	Entry Level
				<p>ITS Technician: \$18.51/hour</p> <p>Traffic Systems/Traffic Signals Technician: \$18.64/hour</p> <p>GIS Technician: \$18.75/hour</p> <p>Civil Engineering Technicians: \$24.03</p>

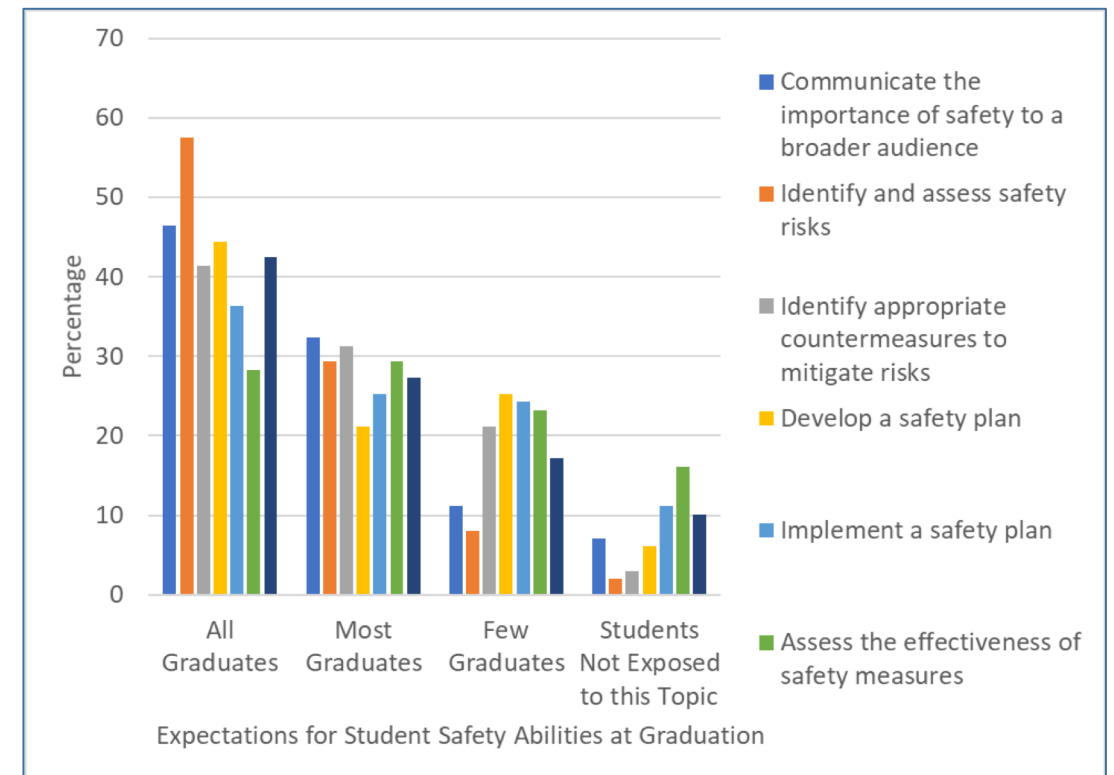
Safety

Industry Certifications

- “Safety Benchmarks” for higher education



Source: <http://www.tpcb.org/>



Engineering Discipline

Midwest Transportation Workforce Center

University of Wisconsin, Madison



Teresa Adams

Director

Engineering

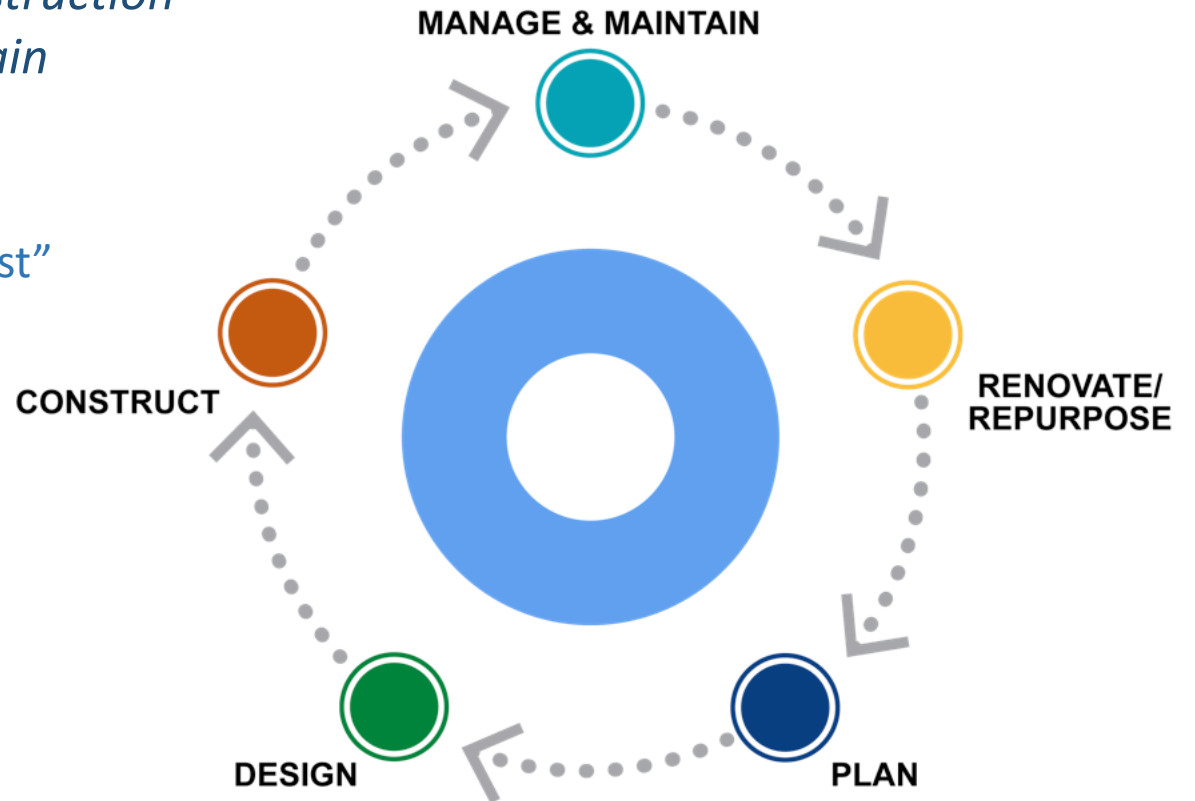
Highway Maintenance Engineering (HME) builds on the skills, competencies, and related training for *Highway Construction* with the education and training to *Manage & Maintain*

Agency Workforce Trends

- Infrastructure Funding Challenges → “Maintenance First”
- From “Design & Build” to “Operate & Maintain”
- “Engineer-ish” Positions filled by Non-Engineers
- Competition for Workers — Construction Jobs
- Outsourcing

The Gap

- Engineering education focuses on new design



Engineering

Key Methodologies

- Bottom-Up Approach
- Deep-Dive into HME
 - Survey Career Paths
 - Interviews
 - Review Job Postings
- Literature Review
- Burning Glass Queries
- BLS Projections
- Technology Trends

Priority Occupations

SOC CODE	OCCUPATION TITLE	CURRENT # EMPLOYEES, 2016	PROJECTED # EMPLOYEES, 2026	PERCENT CHANGE	2016 MEDIAN ANNUAL WAGE
11-1021	General & Operations Managers	2,263,100	2,468,300	9.10%	\$ 99,310
11-9021	Construction Managers	403,800	448,600	11.10%	\$ 89,300
17-2051	Civil Engineers	303,500	335,700	10.60%	\$ 83,540
17-3022	Civil Engineering Technicians	74,500	81,100	8.80%	\$ 49,980
47-1011	1st-Line Supervisors, Const. Trades & Extraction	602,500	678,300	12.60%	\$ 62,980
47-2061	Construction Laborers	1,216,700	1,367,100	12.40%	\$ 33,430
47-2071	Paving, Surfacing, & Tamping Equip. Operators	51,900	58,200	12.10%	\$ 38,970
47-2073	Operating Eng. & Other Const. Equip. Operators	371,100	416,900	12.30%	\$ 45,890
47-4011	Construction & Building Inspectors	105,100	115,700	10.00%	\$ 58,480
47-4051	Highway Maintenance Workers	149,900	160,200	6.90%	\$ 38,130
53-1031	1st-Line Supervisors, Transp. & Material Moving Machine & Vehicle Operators	204,200	217,700	6.60%	\$ 57,270

Engineering

Observations

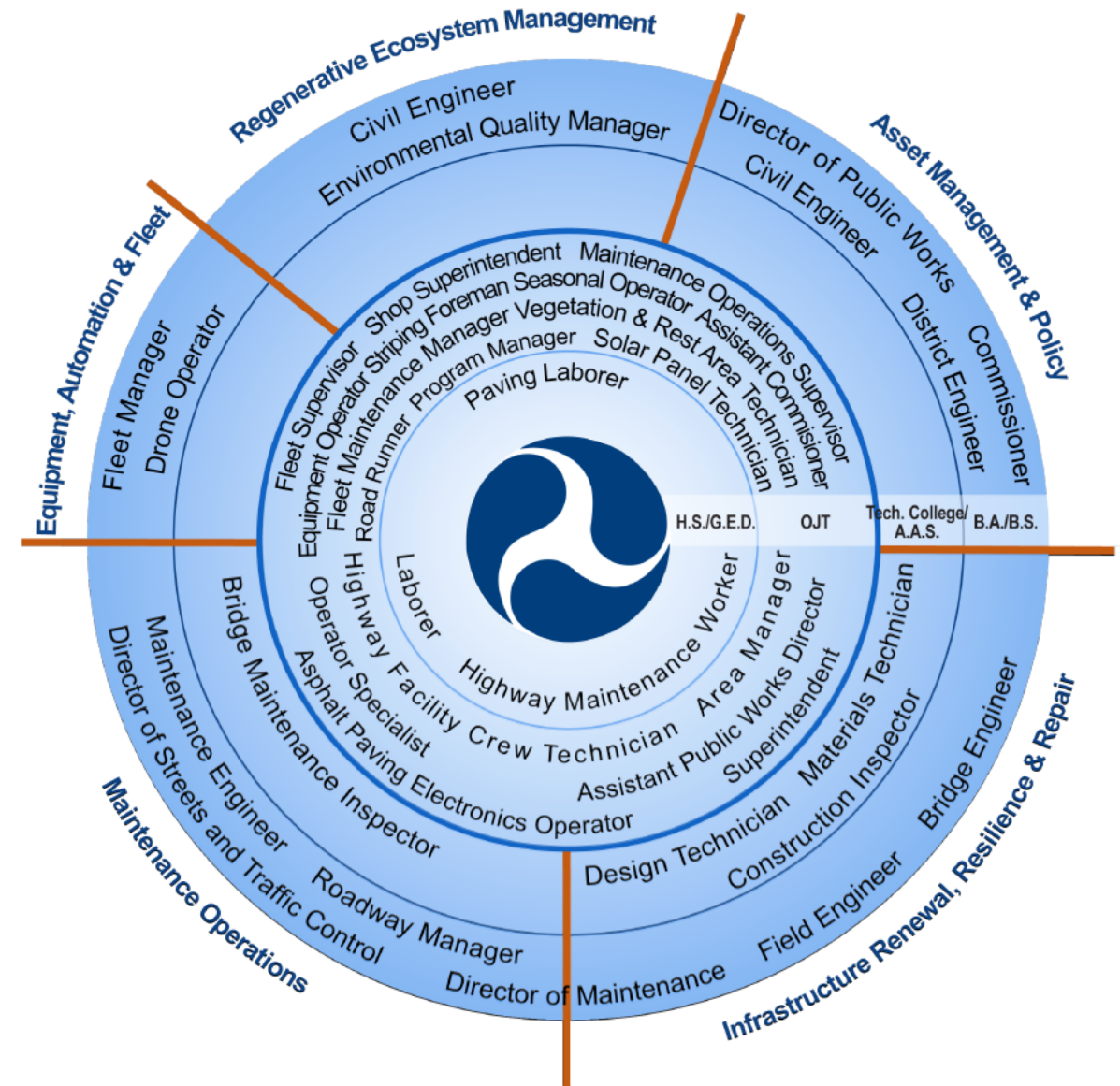
- Heavy reliance on OJT and industry certifications
- T3C, APWA, NHI courses; no standard curriculum

Externalities

- Automated/connected technologies will change the roles of transportation infrastructure
- Shrinking workforce will make equipment automation necessary
- Increasing evidence of human and environmental health impacts of transportation

Strategies

- Pathways to Engineering Tech for incumbents
- Apprenticeships



Bachelors

Associates

Credentialed

Not Credentialed
Training, Certificates of
Completion, CEU, PDH

Gaps

Civil Eng.
Technology

Front Range CC AAS in
Highway Maintenance Mgmt.
2018/2019 - CDOT

AS Civil Eng.
Technology

DOL RA
Equip. Operator
Const. Inspect.
Land Surveyor
Virginia

DOL RA
Maintenance
Municipal Tech
West Virginia

DOL RA
Maintenance
Municipal Tech
Public Works
Oklahoma

Certificates

HWY
Maintenance
Apprenticeship
Ohio/Idaho

Other

LTAP

State DOTs

AASHTO
TC3

NHI

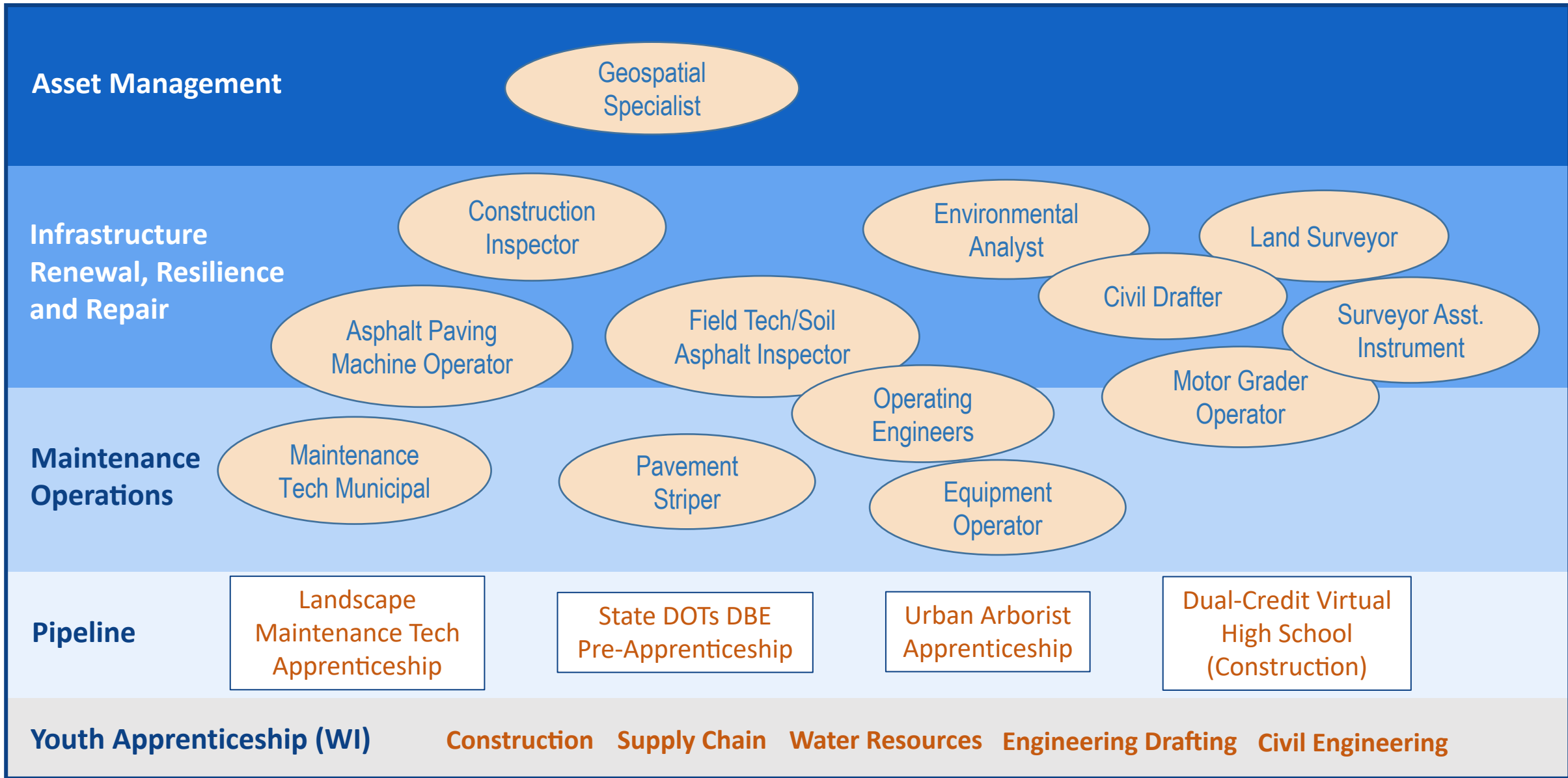
APWA/Other
Professional
Assoc.

Counties

Community
Colleges

Introduction to Highway Maintenance

Safety for Highway Maintenance Workers



Highway Maintenance Career Pathway: Maintenance Operations

	KSAs	ACADEMIC PROGRAM OF STUDY		INDUSTRY CERTIFICATION	JOB & WAGES
LEVEL IV	Maintenance work planning Supervises field crew and field projects Conduct staff performance reviews, hiring and firing Data management and data collection, Training new or existing employees Safety management Customer service and respond to public inquiries Communication skills, written and verbal	<i>Associates Degree (optional)</i> <i>Bachelor's Degree (optional)</i> <i>Professional Development:</i> <i>Highway Maintenance Leadership Academy.</i> <i>Labor relations, snow and ice operations management (Source: UW-Madison).</i>	Supervisory experience required 5 or more years of full-time highway/road maintenance work, highway construction work or highway materials inspection	<input type="checkbox"/> Driver's License <input type="checkbox"/> CDL A/CDL B <input type="checkbox"/> NHI- Highway Maintenance Leadership Academy	Supervisor Level Maintenance and Operations Supervisor <ul style="list-style-type: none"> Highway Field Operations Supervisor Area Manager Salary range: \$48,438 - \$64,745 Annually Source: AASHTO
					Senior Level Maintenance Crew Leader <ul style="list-style-type: none"> Highway Maintenance Foreman Striping Foreman Salary range: \$38,301 - \$51,667 Annually Source: AASHTO
LEVEL III	Supervises field crew and field projects Maintenance work planning Equipment maintenance Safety management Training new or existing employees Available for emergency response	<i>Professional Development:</i> <i>customer service, communications, personnel management, safety (Source: UW-Madison).</i>	4 or more years road maintenance experience 1-2 years experience in operating heavy equipment and road maintenance	<input type="checkbox"/> Driver's License <input type="checkbox"/> CDL A/CDL B <input type="checkbox"/> ATSSA Certified Basic Flagger <input type="checkbox"/> NICET	Intermediate Level Heavy Equipment Operator <ul style="list-style-type: none"> Public Works Street Operator Highway Maintenance Technician Salary range: \$32,521 - \$45,118 Annually Source: AASHTO
					Entry Level Highway Maintenance Worker <ul style="list-style-type: none"> Operations and Maintenance Engineer Intern Civil Engineering Intern Assistant Traffic Engineer Salary range: \$26,395 - \$31,720 Annually Source: Job Postings
LEVEL II	Knowledge of transportation and traffic engineering/operations Operate heavy equipment Ability to work in outdoor environment Ability to work well on a team	<i>Professional Development: surface treatments, road maintenance (Source: UW-Madison)</i>	0-3 years experience in road construction	<input type="checkbox"/> Driver's License <input type="checkbox"/> CDL <input type="checkbox"/> Work Zone Safety Certifications/ Flagger training	
LEVEL I	Ability to work in outdoor environment Ability to work well on a team	High School Diploma or GED <i>Apprenticeship in Highway Maintenance</i> <i>Related Apprenticeship in Landscape Management, Pavement Stripping, Equipment Operator</i>			

Engineering

Summary

Challenge: Engineering positions being filled by non-engineers.

Challenge: Outsourcing will not make the problem go away.

Context: Automated and connected vehicle technologies will change the roles of transportation infrastructure.

Context: Shrinking workforce pool will make automated equipment a necessity.

Context: Increasing evidence of human and environmental health impacts of transportation.

Current Status: Heavy reliance on OJT and industry certifications.

Current Status: T3C, APWA, NHI, etc. courses, but no standard curriculum.

Recommended Strategies

- *Pathways to “Engineering Technician” for incumbent workers*
- *Apprenticeships*

Planning Discipline

Southwest Transportation Workforce Center
California State University, Long Beach



Thomas O'Brien
Director

Planning

An Occupational Analysis

- How do we characterize the role of “Planner”?
- Traditional highly-vertical career specializations

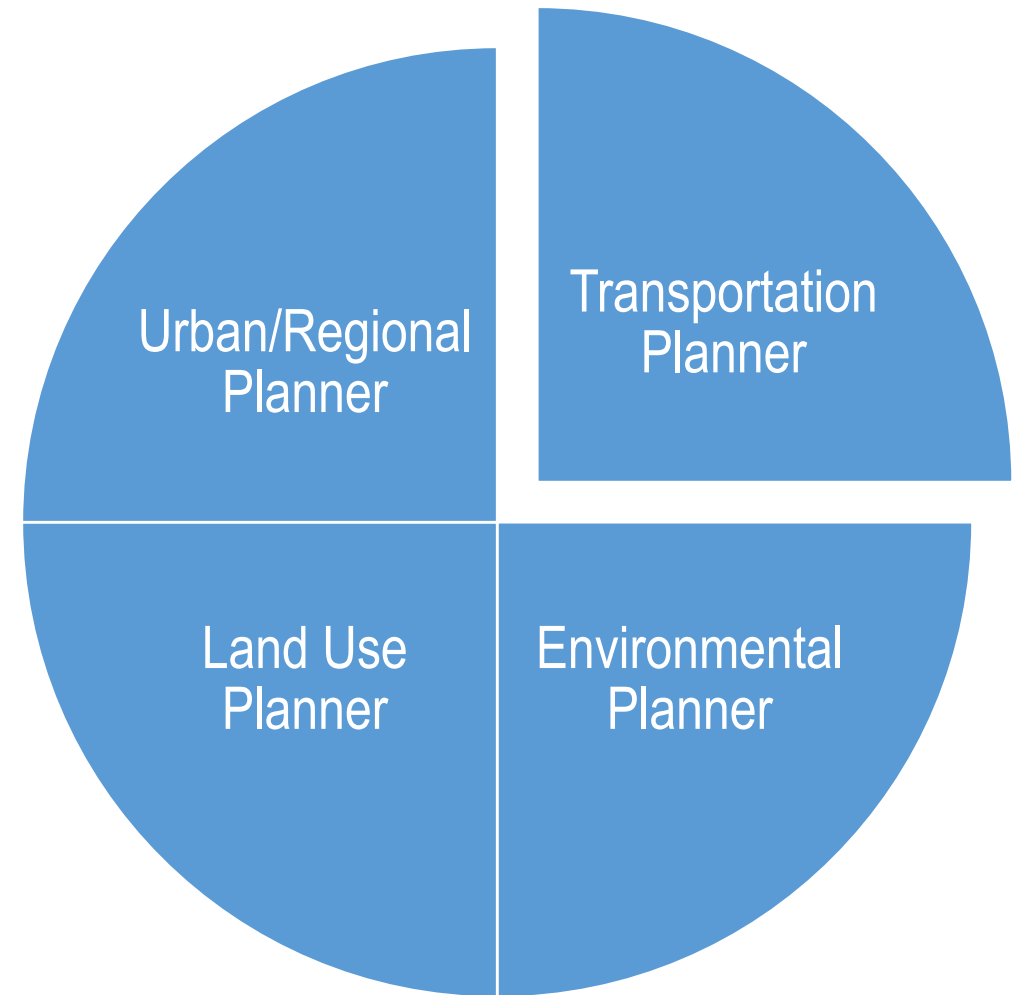
Who are Transportation Planners?

- *“Planners are responsible for designing, evaluating and planning the implementation of state, city or community transportation mediums ...” (Chron)*

Workforce Challenges

- Advancements in technology create competency gaps for planners ... and complicate assessing future job demands and workforce skillsets.

Planning Career Specializations



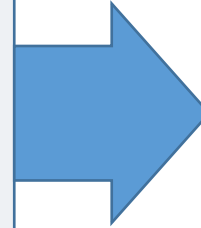
Planning

Characterizing the State of Practice

Employment

Deep-Dive: Labor Market Information

- 2016 Job Needs & Priorities Report (NNTW)
- BLS, O*Net, & Burning Glass LMI Resources
- SCAG & APA Job Posting Competency Analysis
- DWG Advisor / Practitioner Interviews
- Broad Stakeholder Validation (Survey)



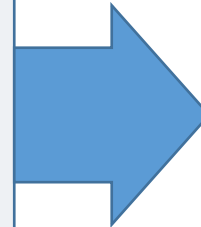
Research Discoveries

1. *Competencies Better Define Occupations*
2. *No LMI for New/Emerging Positions*
3. *Strong KSA Alignment: National vs Local*
4. *Survey Responses Align w/ LMI Assessments*
5. *Planners are Mobile Across Specializations*

Ed & Training

Deep-Dive: Programs of Study

- Volpe National Review of Planning Programs
- Local SoCal Review of Accredited Programs
- Documented 2, 4, & 6-Year Programs of Study
- Began Alignment of Learning Outcomes to KSAs
- Next: Interviews w/ University Program Leads



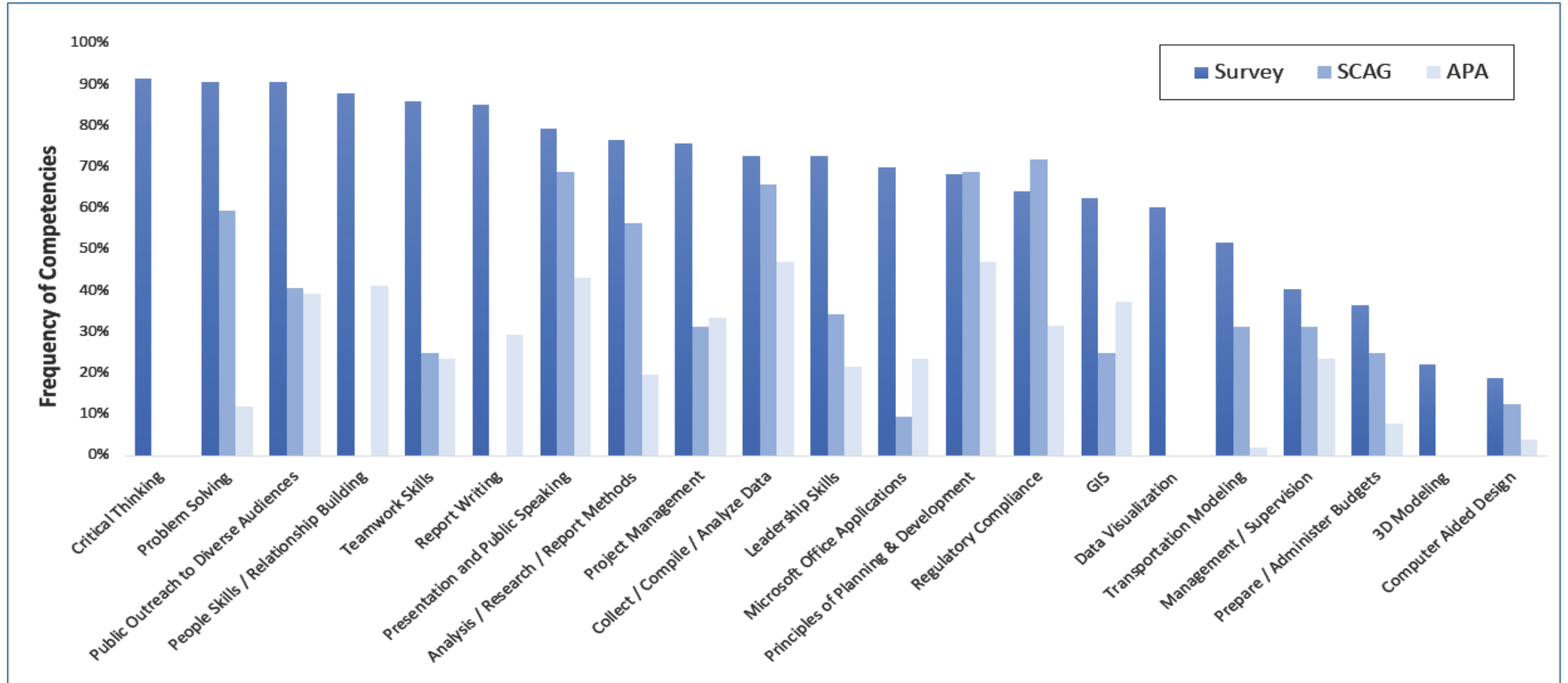
Research Discoveries

1. *Virtually no 2 to 4-Year Feeder Programs*
2. *Few Professional Development Options*
3. *Experiential Learning Rare in Universities*
4. *Limited Pre-Employment Training Options*
5. *College Degree Required for Employment*

Planning

Planning Competencies Assessment

Top Planning Competencies



Planning

Key Research Sources

- BLS Labor Market Analysis
(*except emerging occupations*)
- SCAG/APA Occupational Scans
- Burning Glass Job Postings
- Planning DWG Advisory Input
- Forecasted Sector Impacts from
Transformational Technologies

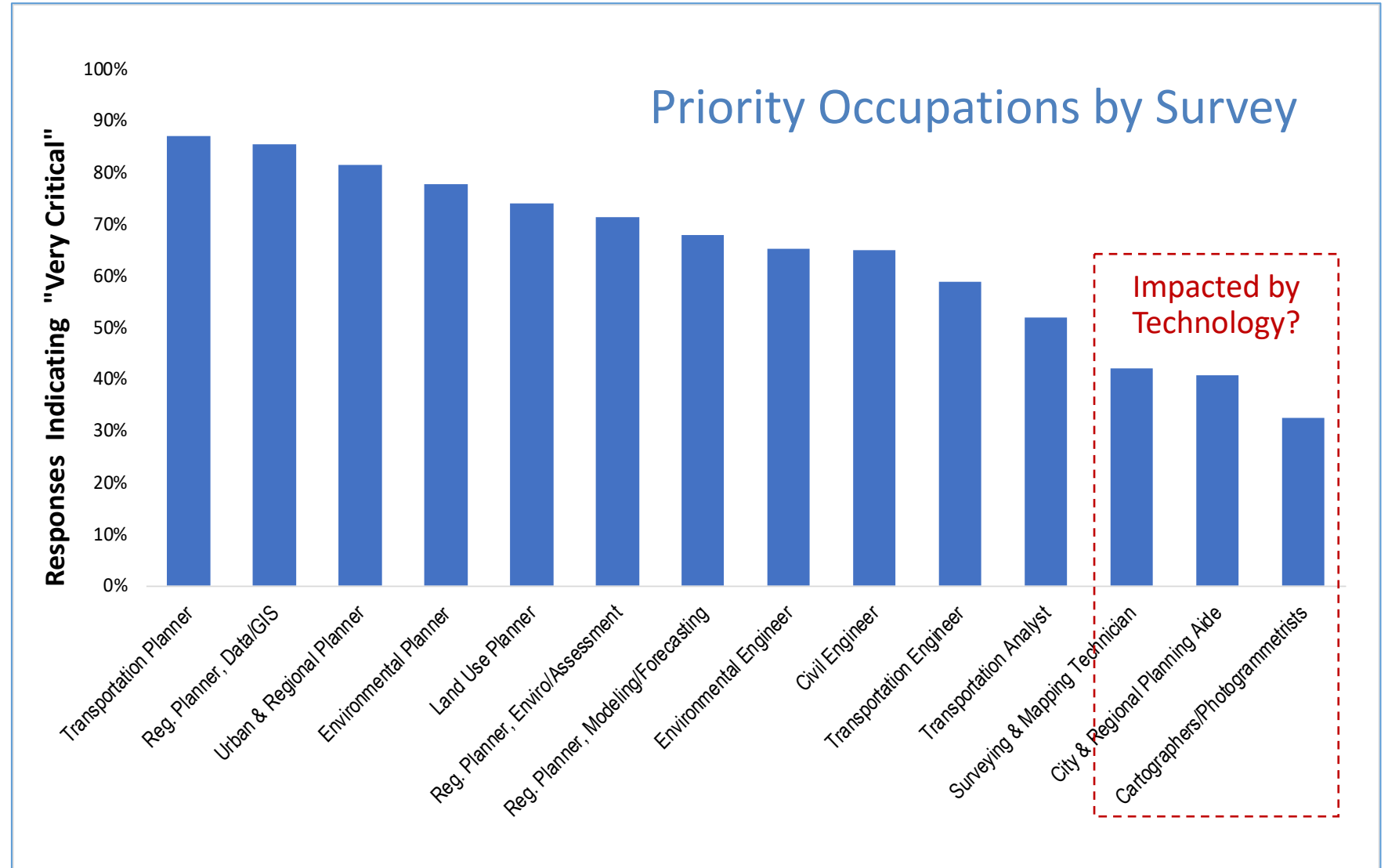
Priority Occupations

O*NET SOC CODE	OCCUPATION	CURRENT # EMPLOYEES, 2016	PROJECTED # EMPLOYEES, 2026	PERCENT CHANGE	2016 MEDIAN ANNUAL WAGE
17-1021.00	Cartographers & Photogrammetrists	12,600	15,000	19.4%	\$62,750
19-3051.00	Urban & Regional Planner	36,000	40,600	12.8%	\$70,020
	Regional Planner, Data/GIS				
	Regional Planner, Modeling & Forecasting				
	Regional Planner, Environment & Assessment				
17-3031.00	Surveying and Mapping Technician	60,200	66,600	10.6%	\$42,450
17-2051.01	Transportation Engineer	303,500	335,700	10.6%	\$83,540
17-2051.00	Civil Engineer	303,500	335,700	10.6%	\$83,540
19-2041.02	Environmental Planner	89,500	99,400	9.9%	\$68,910
17-2081.00	Environmental Engineer	53,800	58,300	8.3%	\$84,890
19-4061.01	City and Regional (Planning) Aide	34,000	35,500	4.3%	\$43,190
	Transportation Analyst				
19-3099.01	Transportation Planner	42,100	44,900	2.7%	\$77,020
	Land Use Planner				

Planning

Survey Validation

- 155 respondents (planner stakeholders)
- Solid alignment w/ research outcomes
- No “write-in” outliers
- Some occupational impacts anticipated?



Transportation Planning Pathway

	KSAs	ACADEMIC PROGRAM OF STUDY & WORK EXPERIENCE		RECOMMENDED CERTIFICATION	JOB'S & WAGES
ADVANCED LEVEL	<ul style="list-style-type: none"> - Considerable knowledge of the theory, principles and techniques of the planning profession and development process - Federal, state and local laws, codes and regulations and recent changes - Principles and practices of supervision, training, performance evaluation, and personnel management - Budgeting and finance - Recent developments, current literature and sources of information related to municipal planning and administration. - Knowledge of local government procedures and practices - Citizen involvement techniques and processes 	<div>Master's Degree in in urban planning, transportation planning, or related field</div> <div>At least three years supervisory experience required</div> <div>Five or more years planning experience</div>		AICP	Advanced Level <ul style="list-style-type: none"> - Planning Director - Executive Director - Director/Owner - CEO/President - Planner IV - Principal Planner - Planning Manager Annual Salary: \$51,848 - 224,307
		<div>Earn AICP Certification</div> <div>Bachelor's Degree in urban planning, transportation planning, or related field</div> <div>Some supervisory experience preferred for Planner III/Senior Planner positions</div> <div>Up to six years planning experience required</div>		AICP	Intermediate Level <ul style="list-style-type: none"> - Planner III - Senior Planner - Planner II - Associate Planner - Junior Planner - Planner I - Assistant Planner Annual Salary: \$43,234 - 107,952
ENTRY LEVEL	<ul style="list-style-type: none"> - Planning principles and practices - Principles and practices of research and data collection - Statistics, algebra, geometry - ArcMAP/GIS, MS Office/Access, Adobe Suite, AutoCAD - Regulation and legislation - Written/oral communication skills - Problem solving and multitasking skills - Teamwork and independent work skills - Public outreach and interpersonal skills 	<div>Associate's Degree/two-year transfer degree/two to three years college experience with major coursework in urban planning, transportation planning, or related field</div> <div>Up to two years work experience desired</div>		N/A	Entry Level <ul style="list-style-type: none"> - Planning Technician - GIS Technician - GIS Analyst - Other Specialized Technician - Graduate Planner - Planning Intern Annual salary: \$24,960 - 74,776

Planning

Summary

- *Highly vertical, hierarchal career path*
- *Strong academic/accredited programs of study at major universities nationwide*
- *Employment generally contingent upon degree attainment*
- *General lack of effective pre-employment experiential learning opportunities*
- *General lack of 4-year feeder programs from community colleges & tech schools*

“Transportation planners undertake a comprehensive analysis and evaluation of the potential impact of transportation plans and programs while addressing the aspirations and concerns of the society served by these plans and programs.”

FHWA



Disciplinary Summary

What have we learned?

Where the Research Led ...

1. What's common across disciplines?

Follow the competencies, not the titles.

2. Who is a Transportation Professional?

It's critical to engage DWG practitioners; deploy "Transportation Spotlights"

3. LMI is fundamental for workforce development partnerships, but ...

It fails to properly characterize emerging fields and occupations.

4. There are systemic academic institutional barriers:

Faculty/curriculum are slow to change, constraints in programs hour limitations and accreditation demands, lack of uniform articulation, limited experiential learning, programs of study are constrained by academic silos, misperceptions around CTE offerings (undervaluing technical occupations), limited funding, etc.

Where the Research Led ...

5. Connecting 2-year to 4-year programs:

Few transportation workers advance from within into advanced positions by earning a degree on-the-job. New career pathways are required to promote these linkages and to bridge 2-year college programs to 4-year university programs.

6. Who is our target audience for these career pathways?

Academic/workforce practitioners. Pathway localization, thru industry/education engagement, will bring targeted refinements necessary for students/incumbents.

7. Evaluating Trans-Tech: forecasting occupational impacts.

Analysis offers “educated guess” at workplace competency impacts and job loss.

8. The Planning Demo ...



Year Two Objectives

Bringing it all together

Year-Two Objectives

NTCPI Project Deliverables

1. Lessons Learned from the Planning Career Pathway Demonstration Project
2. Implementation Plans for Deploying Career Pathways into Post-Secondary
3. Stakeholder Agreements to Implement Pathways Locally (time/budget permitting)
4. Final Project Report & Presentation



The Planning Demo

- Hybrid GIS/Planning Course (Spring 2018)
- Launched at L.A. Trade Tech College
- Leverages CA Strong Workforce Funds
- Dual-Enrollment & Credit Articulation
- GIS-Infused Experiential Learning
- “Planning” Learning Competencies
- Connects 2-Year to 4-Year Programs
- Tracks/Assesses Student Career Paths



**LEARN ABOUT GIS AND
APPLY IT TO YOUR
FUTURE CAREER**

GIS 25 / GEOGRAPHY 25

Course # 12532
**INTRO TO GEOGRAPHIC
INFORMATION SYSTEMS AND
LABORATORY**
Mon./Wed. 5:30 p.m. - 9:00 p.m.

- Develop one of the most highly sought after skillsets
- Careers with a median salary of \$65K
- Learn how to use the latest ArcGIS mapping technology
- Apply it to urban planning, transportation planning, and other related fields

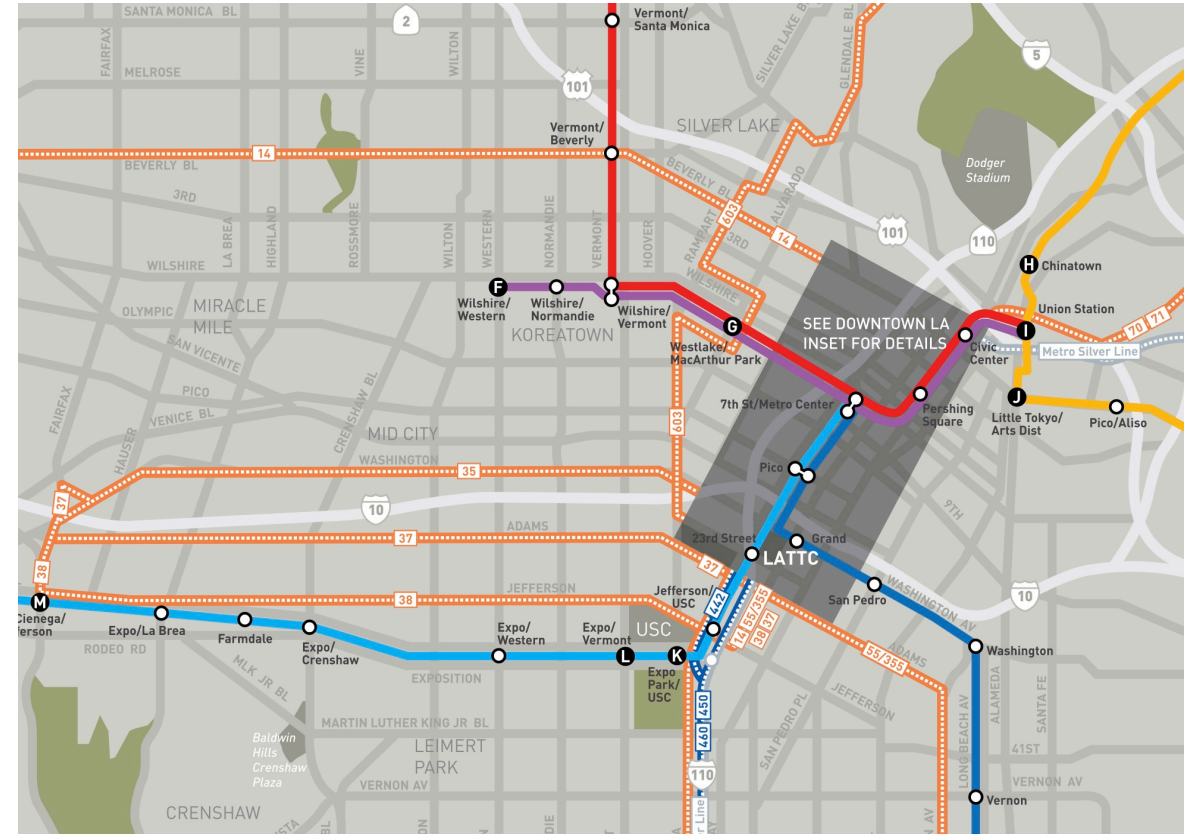
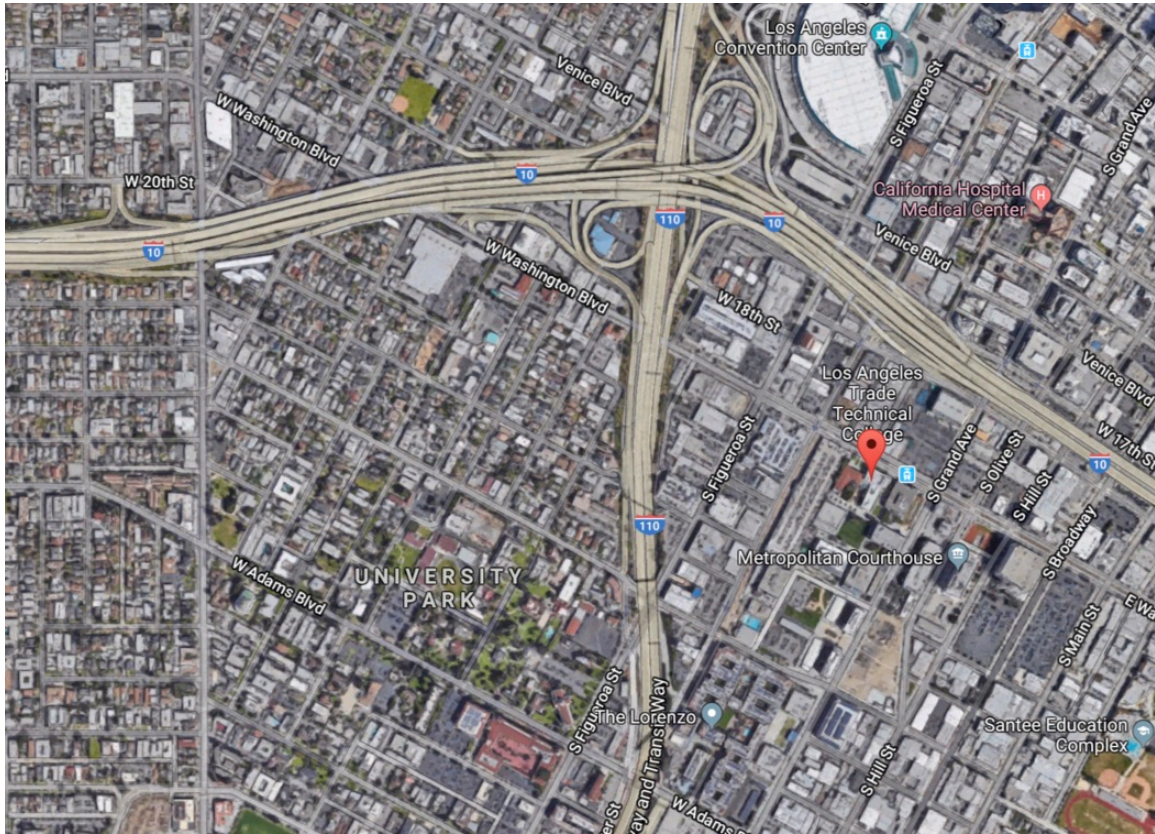
REGISTER TODAY!
FIRST CLASS: FEBRUARY 12, 2018
RSVP: ATMPATHWAY@LATTTC.EDU

FREE TEXTBOOK!

The Planning Demo

Los Angeles Trade Technical College

- A complex metropolitan location serviced by multiple transportation modalities

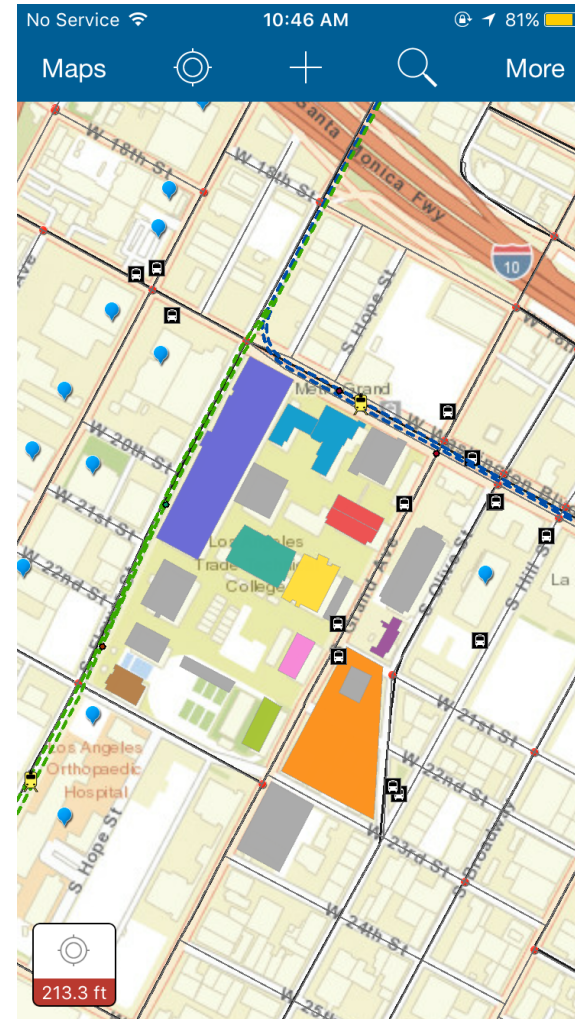


The Planning Demo

It's All About Experience

- Infusing planning-based projects into standard classroom curriculum
- Engaging industry support: site visits, guest speakers, technology, etc.
- Career pathway as curriculum: from college students to industry pros

"There's a need for much greater collaboration across academia and industry than ever before, to address transportation workforce challenges and adequately prepare students for careers of the future." (Ivey)



No Service 10:46 AM 81%

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Location
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Freight:

Auditor/Audit Team >

Specify in there are conflicts among different modes of... >

Are driveways accessible for freight/delivery trucks? >

Is truck signage clearly visible? >

Are loading zones clearly marked/visible? >

Is there adequate curb space for curbside loading and... >

Do freight/delivery trucks have an adequate turn radius... >

Do freight/delivery trucks have an adequate turn radius... >

Do freight/delivery trucks have an adequate turn radius... >

Do freight/delivery trucks have an adequate turn radius... >

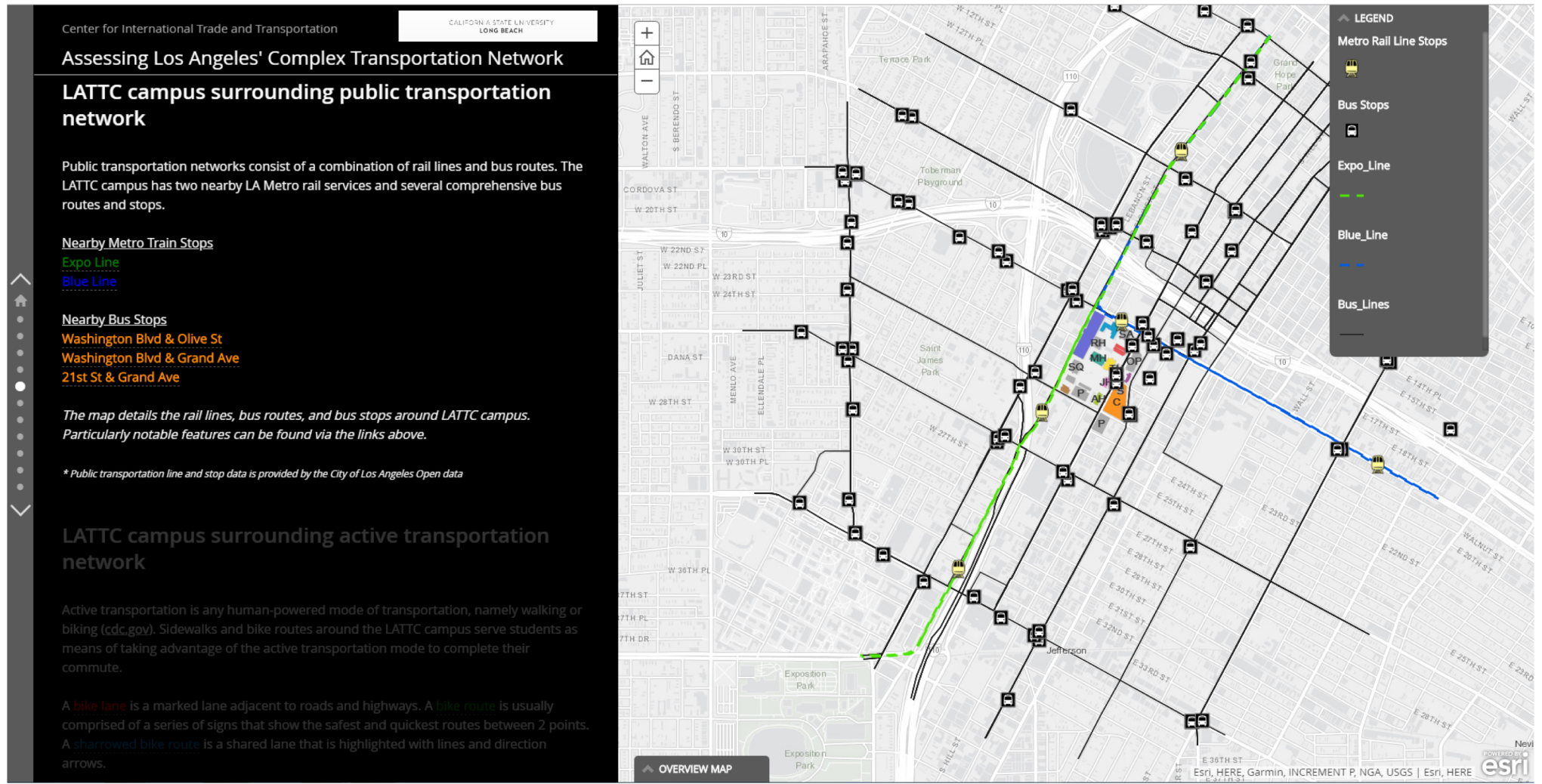
Are there residential areas that are adversely affected b... >

Is pedestrian, bicycle, public or motorist transit adverse... >

The Planning Demo

<https://arcg.is/0P1qia>

Engaging
industry to
enhance
curriculum
through
technology



The Planning Demo

Engaging students through practical, localized planning activities

Different transportation routes from your home to LATTC

LATTC students travel to campus via the vehicle, public, and active modes of transportation. A route scenario from a hypothetical student's home in Boyle Heights to the LATTC campus is shown on the map here. Four routes are shown for each mode of transportation and an additional alternative route for personal vehicles.

Vehicle - City Streets

The vehicle transportation route takes advantage of side streets to get to campus. Freeway congestion can inhibit traffic flow during peak hours so often time side streets are quicker.

Vehicle - Highway

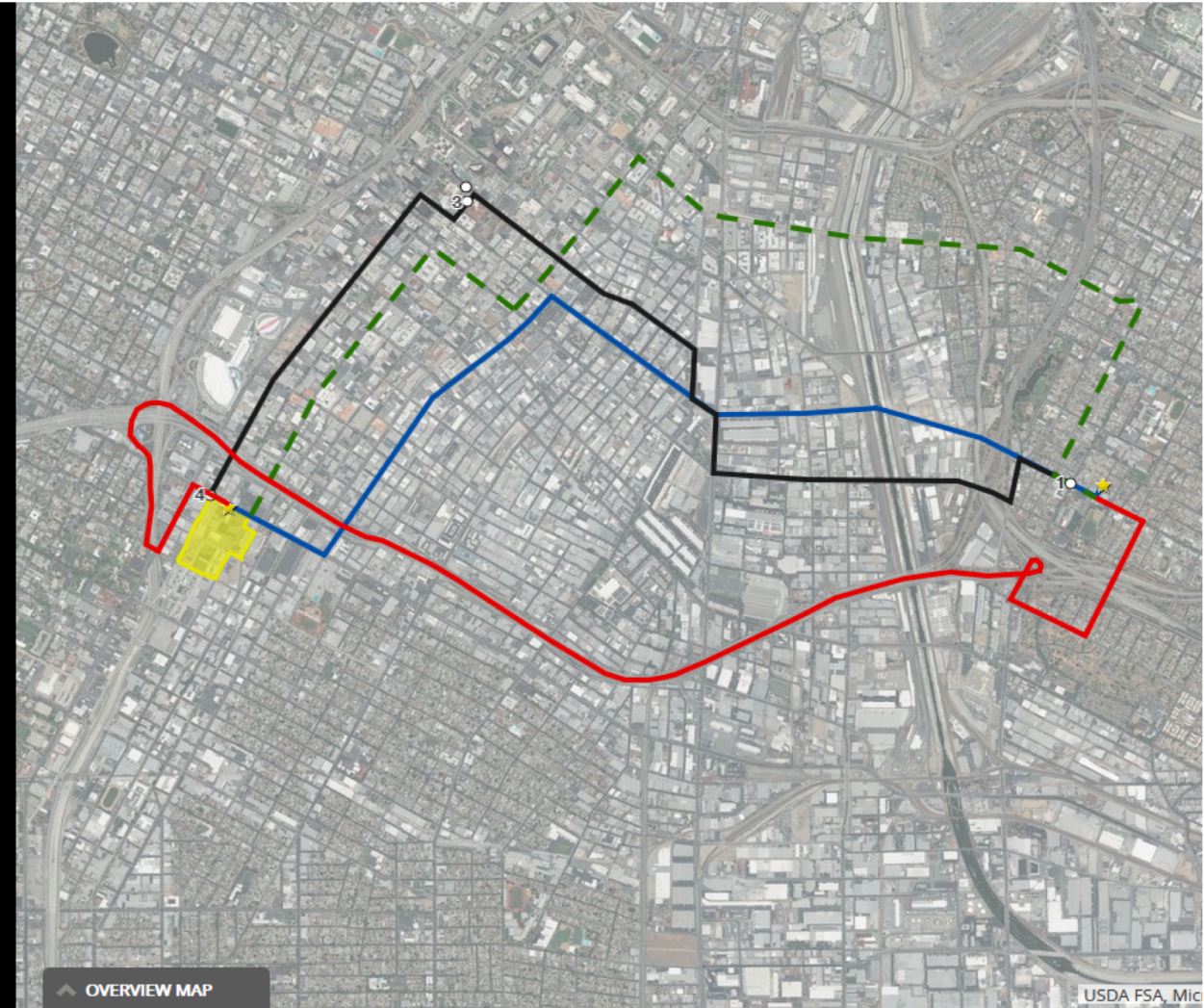
While side streets may pose as a faster alternative to get to campus, students still may want to take a highway. The highway route displayed utilizes the I-10 W freeway. At a distance of 7.5 miles, the travel time is still expected to be close to an hour.

Public

Students can use bus routes to get to campus. The 720 and 950 bus lines can be used to get from the Boyle Heights home to LATTC.

Active

Active students can use the expansive bike lane system throughout LA to get to campus. The nearest bike route to the hypothetical home is a few blocks away, so the student can walk for a bit before getting on a route that ends up right on LATTC campus.



The Planning Demo

GIS Transportation Planning Career Pathways

Geographic Information System technology is utilized by transportation planners at all levels.

Entry Level - GIS Technician

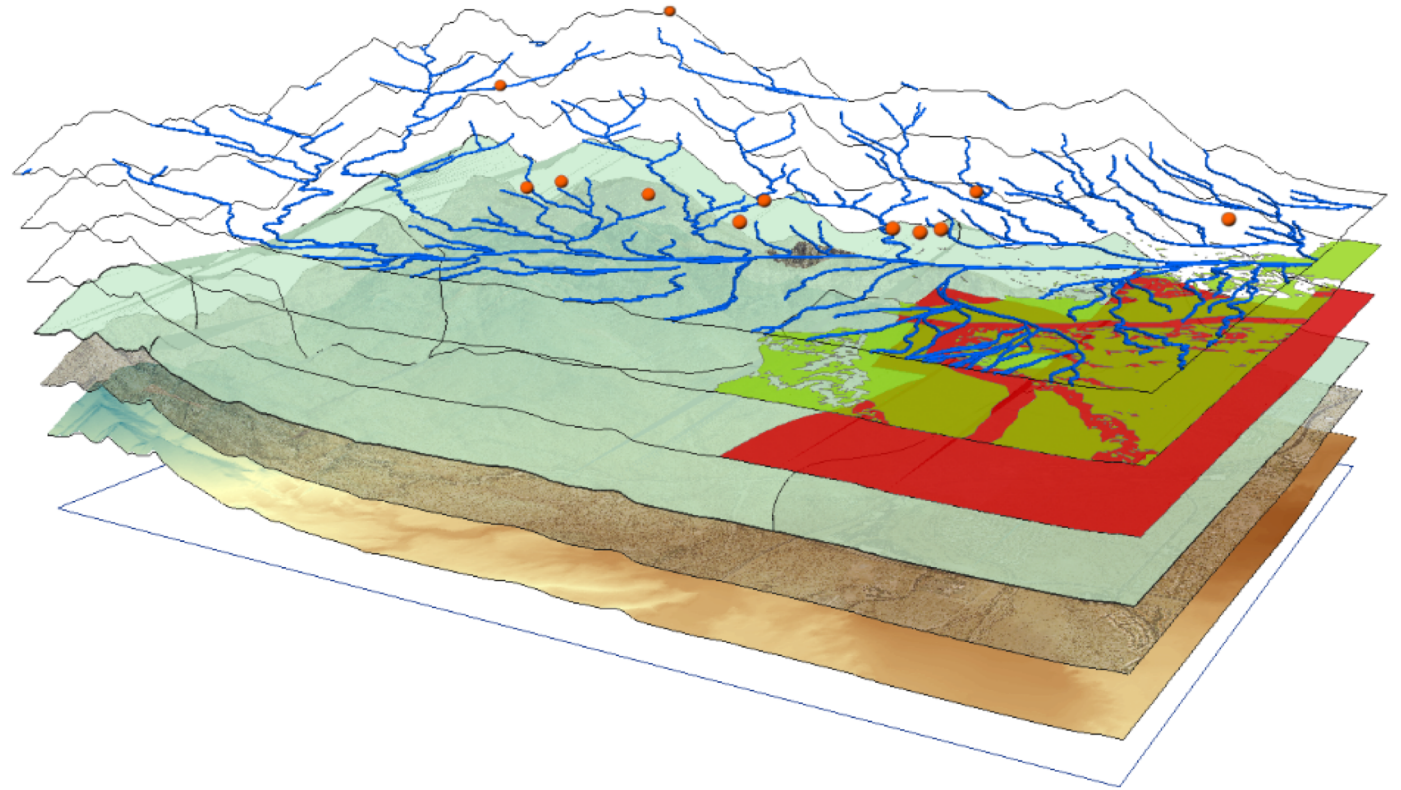
- Salary Range: \$38,000 - \$66,000
- Education and Industry Certification
 - Associates Degree (2 year) in Urban Studies or related specialization

Mid Level - GIS Analyst

- Salary Range: \$74,776 - \$97,219
- Education and Industry Certification
 - B.S./B.S. in Urban and Regional Planning with a transportation focus
 - B.A./B.S. in Urban Studies and Planning Minor in Urban and Regional Studies, Urban Sustainable Planning
 - Masters degree is highly desirable (could be substituted for 2-4 years of related work experience)

Advanced Level - Regional Planner Specialist

- Salary Range: \$95,388 - \$124,009
- Education and Industry Certification
 - Masters of Urban and Regional Planning (MURP)
 - Masters of Planning with a Concentration in Transportation and Infrastructure Planning
 - Certificate of Transportation Systems Professional Education in Collaboration with American Planning Association
 - Masters degree is highly desirable (could be substituted for 2-4 years of related work experience)



Bringing the Career Path into the Classroom

Implementation Plans

- Articulate pathway strategies & designs to post-secondary partners
- Provide a methodology for refinement to address local industry needs
- Target workforce administration; serve students & returning professionals
- Identify institutional barriers; recommend actions to overcome
- Demonstrate connections between 2-year and 4-year programs

“A detailed description of the related curriculum, training, education, and experiential learning activities for each key occupation developed in concert with the Discipline Working Groups and other stakeholders.”

NTCPI Executive Summary

Stakeholder Commitments

- Engage post-secondary stakeholders; secure commitments for pathway implementation & deployment
- Establish programs to leverage strengths, resources, and community partnerships to promote sustainability of pilot efforts
- Recognize diverse stakeholder needs and identify common priorities
- Refine pathway deployment strategies based on planning pilot demonstration

“NNTW will continue to engage their post-secondary institutional partners and disciplinary sector employers to reach specific agreements to deploy their career pathway solutions regionally.”

(NNTW Project Plan, Year 2)

Final Report & Presentation

- Final Research Methodologies
- Final Occupational Priorities
- Final Career Pathways w/ Competency Models (KSAs) & Implementation Plans
- Analysis of Planning Demonstration
(how it informs pathway development)
- Barriers/Recommendations for Deployment into Post-Secondary Institutions
- Status of Implementation Partnerships



Beyond the Initiative

Transportation Career Website

- A dynamic, interactive, education & career guidance resource
- Educator, student, & employer-facing portals connect all career stakeholders



Regional Pathway Deployment

- Promote transportation pathways by connecting industry to education
- Work w/ faculty to update curriculum & contextualize learning activities
- Work w/ major infrastructure stakeholders to forecast/prepare transportation workers
- Regularly convene academic/workforce panel to advance pathway deployment
- Act as clearinghouse for pathway templates, regionalized LMI & gap analyses, specialized curricula, capstone projects, etc.

Learn More at:
www.NNTW.org

