

Transportation Engineering

SECTION 4.0 CAREER PATHWAY IMPLEMENTATION

4.1 Project Title

“Advancing Apprenticeship in Highway Maintenance & Engineering”

4.2 Workforce Priority

Across the country, state DOTs cite filling highway maintenance positions as their biggest workforce challenge. In the Fall of 2017, the MTWC surveyed Wisconsin municipalities to learn about the highway maintenance workforce in Wisconsin, to get the background needed to develop a career pathway and credentialed training, and to assess opportunities to establish a “middle-skills” apprenticeship program. The U.S. DOL has provided states with funding to accelerate the adoption of apprenticeship beyond traditional trade programs into new industries like banking and insurance, and studies have concluded that apprenticeships deliver a high ROI for employers in terms of recruiting and retaining workers.

MTWC’s survey documented more than just issues with work retention and recruitment, but also a lack of formal training and an industry sector with little knowledge of basic or innovative workforce development practices. As a result of this discovery, the Bureau of Apprenticeship Standards (BAS) at the Wisconsin Department of Workforce Development (DWD) have partnered with MTWC to inform employers of the apprenticeship model and to determine their interest in pursuing a statewide apprenticeship in highway maintenance. The results so far are positive; employers see an apprenticeship in highway maintenance as the first step in delivering “consistent training across Wisconsin”.

4.3 Project Description

MTWC will address the biggest workforce challenge facing state DOTs by focusing on apprenticeship as a vehicle to connect highway maintenance workers to post-secondary education.

In its intermediary role, MTWC will have (by this project’s start date) partnered in establishing a statewide apprenticeship in Wisconsin, educated employers on the apprenticeship model, recruited subject matter experts, coordinated and funded a DACUM occupational analysis, and participated in the development process of setting-up a new apprenticeship.



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By the end of this implementation plan's third year, there will also be a career pathway that connects this apprenticeship to civil engineering technician and highway maintenance management programs and materials that will assist employers in building apprenticeships in their own communities to facilitate the emergence of a new and prepared maintenance workforce ready to navigate the transition to a sensor-based, artificial intelligence workplace.

This plan's deployment activities are listed here and discussed in detail below.

- Document the implementation of a highway maintenance apprenticeship.
- Articulate the apprenticeship to other post-secondary programs.
- Increase awareness of highway maintenance occupations.
- Embed maintenance concepts in youth apprenticeship.
- Scale the highway maintenance apprenticeship.

Document Implementation of Highway Maintenance Apprenticeship (HMA)

A documented process will help scale the HMA project and serve as a model for the development of other transportation apprenticeships. It will also facilitate replication across other FHWA regional centers, private employers, state associations, or state DOTs.

MTWC will take on the role of facilitator and will engage with employers, most likely through an apprentice mentor or other employee following apprentice progress or who understands the institutional impact of the apprenticeship. MTWC will build a Community of Practice (CoP) by convening regular meetings, provide a means of member communication, allow the group to set the agenda, and address all institutional impacts through-out the year. Topics for CoP discussion include recruitment issues, organizational impacts, curriculum changes, and wrap-around services needed to support apprentices. An annual apprenticeship advisory meeting will be an opportunity to hear from the apprenticeship educators on the challenges they encountered. CoP members may also belong to the apprenticeship advisory group.

Community of Practice

A group of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly. CoPs meet as often as needed to solve problems. In theory, the CoP emerges as an organic expression of a group's needs and is meant to exist as long as the group needs it to last, sometimes transforming into other CoPs to solve new problems.

MTWC will develop metrics for evaluation of the HMA, based on discussion and data gathering during CoP meetings. The final documentation will be written from an employer perspective to help scale the statewide apprenticeship to other municipalities, a focus of Years 2 & 3.

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Articulate Apprenticeship to Post-Secondary Programs

There are currently many training programs and credentials relevant to highway maintenance, however they are not linked to post-secondary systems. MTWC found that only the NAFA Fleet Management Association offered college credit for certification.

In order to articulate the HMA, MTWC will ensure the apprenticeship becomes registered with DOL, then work with two community college programs to establish articulation agreements.

At one WTCS college, apprentices receive a certificate of completion that provides up to 39 credits toward an associate degree in Journeywork (the number of credits depends on the length of the apprenticeship). The remaining 21 or more credits required for a Journeywork Associate of Applied Science (AAS) degree typically come from general education coursework. An AAS in Journeywork does not articulate to an AAS in Civil Engineering Technology or a civil engineering program. WTCS will work with MTWC to ensure that HMA articulates to an associate degree that will transfer to an engineering degree, providing greater flexibility and academic efficiency for students pursuing other career paths.

MTWC will then work with one of the RACC colleges, Front Range Community College (FRCC) in Colorado, to articulate the HMA to its two-year AAS in Highway Maintenance Management (HMM) program. The HMM program combines existing online courses with a comprehensive process for granting credit for prior learning. Scheduled for launch in August 2019, HMM is designed to help employees meet the demands of the future while earning post-secondary credentials and is targeted at highway maintenance supervisors or those wishing to advance in the organization or to be better prepared for supervisory positions.

While some workers may not be interested in pursuing higher education, survey responses from maintenance professionals in Wisconsin often regretted not acquiring a college. By facilitating post-secondary education, we can help move workers into technical fields and improve the talent pipeline for transportation agencies.

During this implementation, FRCC will work with MTWC on three fronts: articulate the HMA to their HMM degree, pilot a prior learning assessment for HMA participants, and determine what training—offered through the University of Wisconsin at Madison, Engineering Professional Development—would articulate to an HMM degree.

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FRCC’s HMM degree is relevant to state, county, and municipal public works agencies as well as companies in the private sector involved in the maintenance of roads and bridges. It features general education, management, highway maintenance, and operations courses. General education and management courses will be available online for learning flexibility, supporting participation from a national audience. Students will have the option to complete coursework by attending an FRCC campus located in three counties in Colorado.

A graphic showing the proposed progression of articulations is shown in Figure 4.3.1:

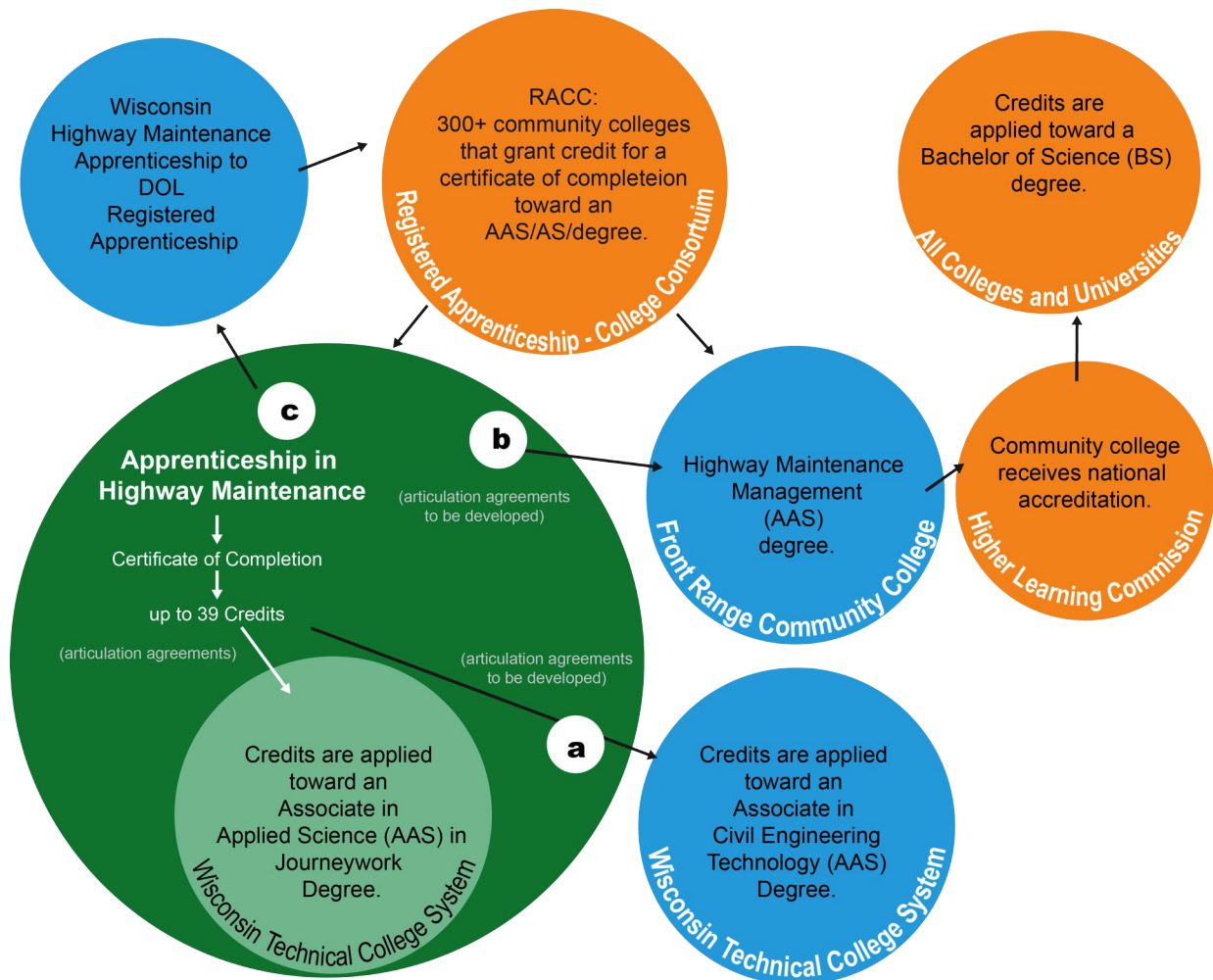


Figure 4.3.1: How an Apprentice Can Obtain a Degree

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Increase Awareness of Highway Maintenance Occupations

To improve awareness of the highway maintenance field, MTWC will embed its career package of seven priority occupations into career information systems used in Wisconsin, to establish an online presence for students and workers. Some of these systems have national reach:

[Career Cruising in Wisconsin](#)

[Wisconsin Job Centers](#)

[Wisconsin Career Readiness Pathways](#)

[BLS K-12 Career Information](#)

[CTE Programs of Study](#)

[Military Career Guide](#)

[Student Career Info](#)

Career Cruising is the career information system vendor for Wisconsin. In 2018, Wisconsin implemented academic career planning in grades 5–12, requiring all students to review careers within Career Cruising and to meet with their guidance counselor and families to review careers of interest. Career Cruising includes the INSPIRE module which connects employers to students through a number of experiential programs.

Embed Maintenance Concepts in Youth Apprenticeship

The U.S. DOL and Project Lead the Way (PLTW) have partnered to launch a pilot youth apprenticeship program in engineering in the Fall of 2018. This pilot offers two pathways to meet the needs of students with different career goals.

The first, an Engineering Assistant program, is geared toward students planning to pursue a four-year engineering degree. The second, an Engineering Technician program, is geared for students looking to start their careers early by offering a hands-on apprenticeship experience with a chance to get an associate degree.

PTLW is a nonprofit organization that provides experiential learning experiences and curricula for K-12 students and teachers. The group helps students develop in-demand, transportable skills through the exploration of real-world challenges. They offer pathways in computer science, engineering, and biomedical science. They also provide teachers with training, resources, and support.

Approximately 11,500 elementary, middle, and high schools in all 50 states and the District of Columbia offer PLTW programs.

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MTWC will work with PLTW to include highway maintenance and asset management concepts in its youth engineering apprenticeships and civil engineering K-12 programs. In Wisconsin, MTWC will work with the Bureau of Apprenticeship to ensure that these concepts are included in the STEM Skill Standards Checklist, a youth apprenticeship covering civil engineering topics.

Scale the Highway Maintenance Apprenticeship

MTWC will ensure the HMA becomes a DOL Registered Apprenticeship and offers a certificate of completion that is portable and recognized all over the U.S. Any employer across the country can use the HMA blueprint as a starting point for their own needs.

MTWC will facilitate employer outreach to 72 counties in Wisconsin, to encourage that they hire apprentices. Outside Wisconsin, MTWC will contact state DOT HR departments plus over 1,000 national stakeholders, to provide information on the benefits and lessons-learned from employers who hire apprentices during the first year of plan deployment. MTWC will also provide a “system” view of how an apprentice can earn a degree while being employed.

4.4 Implementation Partners

The organizations below have committed time and resources to the successful deployment of the Wisconsin Highway Maintenance Apprenticeship. They will continue to be partners in the articulation of the apprenticeship to other degree programs.

Wisconsin Department of Workforce Development (DWD). The Bureau of Apprenticeship Standards ([BAS](#)) at DWD is a national leader that serves as a model in developing innovative apprenticeships for workers and youth. BAS will provide staff time to attend highway maintenance events offered by APWA and the Wisconsin County Highway Association to educate the transportation sector on apprenticeship—a necessary step for project scaling.



Wisconsin Technical College System (WTCS). WTCS consists of 16 public technical colleges that offer over 500 programs awarding two-year associate degrees, one/two-year technical diplomas, and short-term technical diplomas certificates. It is the major provider of customized instruction and technical assistance for Wisconsin employers and apprenticeships.



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WTCS will attend and participate in planning and working group meetings, provide guidance on career pathway models, connect the project to potential resources within WTCS, and provide guidance on creating pathways to the WTCS Civil Engineering Technology AAS degree.

Employer Partners. To be identified at a later date, these employers will be part of a Community of Practice and provide employee subject matter experts for the HMA project.

Future Partners. Eventually, MTWC looks to partner with FRCC, PTLW, the Registered Apprenticeship College Consortium, and broad industry representatives such as AASHTO.

4.5 Partner Commitments

In an expression of their commitment to the deployment and mission of this implementation plan, MTWC partners have “signed-on” as key contributors of time, expertise, and resources, through the authorized letters of agreement presented below. It is this level of engagement that makes the HMA program both achievable and scalable.

<p>Department of Workforce Development Employment and Training Division Bureau of Apprenticeship Standards 201 E. Washington Ave., Room E100 P.O. Box 7972 Madison, WI 53707 Telephone: (608) 266-3332 Fax: (608) 266-0766 Email: DWDEET@dwd.wisconsin.gov</p>	<p>STATE OF WISCONSIN COODWD Department of Workforce Development</p> <p>Tony Evers, Governor Caleb Frostman, Secretary</p>
<p>February 4, 2019</p>	
<p>Dr. Teresa Adams, Director Midwest Transportation Workforce Center University of Wisconsin-Madison 1415 Engineering Drive Room 2205 Madison, WI 53706</p>	
<p>RE: National Transportation Career Pathways Initiative Highway Maintenance Career Pathway Implementation Partnership</p>	
<p>Dear Dr. Adams:</p> <p>The Wisconsin Department of Workforce Development, Bureau of Apprenticeship Standards (DWD-BAS) is pleased to partner with the Midwest Transportation Workforce Center (MTWC) in the deployment of a career pathway program for the highway maintenance and civil engineering workforce. DWD is firmly committed to advancing communities through pathways to academic, career, and transfer success that empower students to achieve career technical certificates, associate degrees, access to 4-year institutions, and local employment. We believe partnering with MTWC in this venture is in direct alignment with our mission.</p> <p>We understand the proposed project seeks to scale a highway maintenance apprenticeship, by working with employers and apprentices documenting their experiences and institutional issues during the first year of a highway maintenance apprenticeship. The project will also articulate the highway maintenance apprenticeship to Front Range Community College's Highway Maintenance Management Degree and the Civil Engineering Technology degree offered by the Wisconsin Technical College System.</p> <ul style="list-style-type: none">• Provide leadership in developing workforce solutions.• Provide technical assistance to employers in the apprenticeship recruitment process• Work collaboratively to develop and administer training programs.• Work with MTWC partners to establish an Employer Sponsorship Program.• Assist both apprentices and employers in providing student support services, including transportation career guidance. <p>DWD, the Bureau of Apprenticeship Standards is highly supportive of this initiative and we look forward to continued partnership in developing apprenticeships in the transportation sector.</p> <p>Sincerely, <i>Karen P Morgan</i> Karen Morgan, Director Bureau of Apprenticeship Standards Wisconsin Department of Workforce Development</p>	
<p>DETA-9510-E (R. 01/2019) http://dwd.wisconsin.gov</p>	

<p>WISCONSIN TECHNICAL COLLEGE SYSTEM We are futuremakers</p>	<p>Dr. Morna K. Foy, President 4622 University Avenue PO Box 7874 Madison, Wisconsin 53707-7874 608.266.1207 Wisconsin Relay System: 711 info@wtcsystem.edu www.wtcsystem.edu</p>
<p>Dr. Teresa Adams Director, Midwest Transportation Workforce Center University of Wisconsin-Madison 1415 Engineering Drive Room 2250 Madison, WI 53706</p>	
<p>January 8, 2019</p>	
<p>Dear Dr. Adams,</p> <p>The Wisconsin Technical College System (WTCS) consists of 16 public Technical Colleges across the state of Wisconsin and offers more than 500 programs awarding two-year associate degrees, one- and two-year technical diplomas and short-term technical diplomas and certificates. In addition, the System is the major provider of customized instruction and technical assistance for Wisconsin employers and Wisconsin Apprenticeship programs.</p> <p>WTCS is a leader in providing effective career pathways for students and incumbent employees at many different stages of their journeys. WTCS is pleased to partner with the Midwest Transportation Workforce Center in the Highway Maintenance career pathway project.</p> <p>As a partner, we intend to participate in the following ways:</p> <ul style="list-style-type: none">- Attend and participate in planning and working group meetings.- Provide guidance on career pathway models.- Participate in the development of potential apprenticeship programs.- Connect the project with potential resources within WTCS.- Provide guidance on potential pathways to WTCS Civil Engineering Technology AAS degrees.	
<p>Sincerely, <i>Chrystal R Seeley-Schreck</i></p> <p>Chrystal Seeley-Schreck Associate Vice President – Office of Instructional Services chrystal.seeleyschreck@wtcsystem.edu office: 608-266-2654</p>	
<p><small>COLLEGES: Blackhawk, Chippewa Valley, Fox Valley, Gateway, Lakeshore, Madison Area, Mid-State, Milwaukee Area, Moraine Park, Nicolet Area, Northcentral, Northeast Wisconsin, Southwest Wisconsin, Waushara County, Western, Wisconsin Indianhead</small></p>	

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4.6 Project Outcomes

MTWC believes this project's greatest impact will be a sea-change on how transportation agencies think about their workers. By facilitating access to post-secondary education, it will help produce workers who are more technical, innovative, and trained to think holistically, thus improving the talent pipeline for transportation agencies.

Documenting the HMA process will result in the following outcomes, some of which are transformational. Metrics will be developed to measure these outcomes.

1. Greater transparency of the apprenticeship development process in Wisconsin.
2. Awareness in municipalities of contemporary workforce development strategies.
3. A comprehensive guide for replication.
4. List of best practices.
5. Use of common metrics across municipalities to measure collective impact.

4.7 Project Timeline

Each of the major activities for this project are listed below, along with a schedule of their basic deployment. A first year workplan for the demonstration project is also included.

Document Implementation of HMA

- | | |
|-------------------------------------|--------------------|
| 1. Engage Employers and Apprentices | July – August 2019 |
| 2. Conduct CoP Meetings | Monthly |
| 3. Develop Metrics | January 2020 |
| 4. Draft Final Report | August 2020 |
| 5. Develop State/National Campaign | August 2020 |
| 6. Attend Conferences | Fall 2020 |
| 7. Quarterly Reports | Quarterly |

Articulate HMA to Post-Secondary Programs

- | | |
|------------------------------------|---------------|
| 1. Ensure HMA is Registered by DOL | January 2020 |
| 2. Meet with WTCS, FRCC, DOL | February 2020 |
| 3. Initiate Articulation | March 2020 |
| 4. Create Promotional Campaign | March 2020 |
| 5. Develop Metrics | March 2020 |
| 6. Draft Report | June 2020 |

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Increase Awareness of Highway Maintenance Occupations

- | | |
|--|-----------------------|
| 1. Conduct Workshop Meeting with Stakeholders | January 2020 |
| 2. Determine Timeline for Implementation | May 2020 |
| 3. Develop Campaign to Inform Educators & Counselors | September 2021 |
| 4. Develop Metrics | September 2021 |
| 5. Implement Campaign | September – June 2022 |

Embed Maintenance Concepts in Youth Apprenticeship

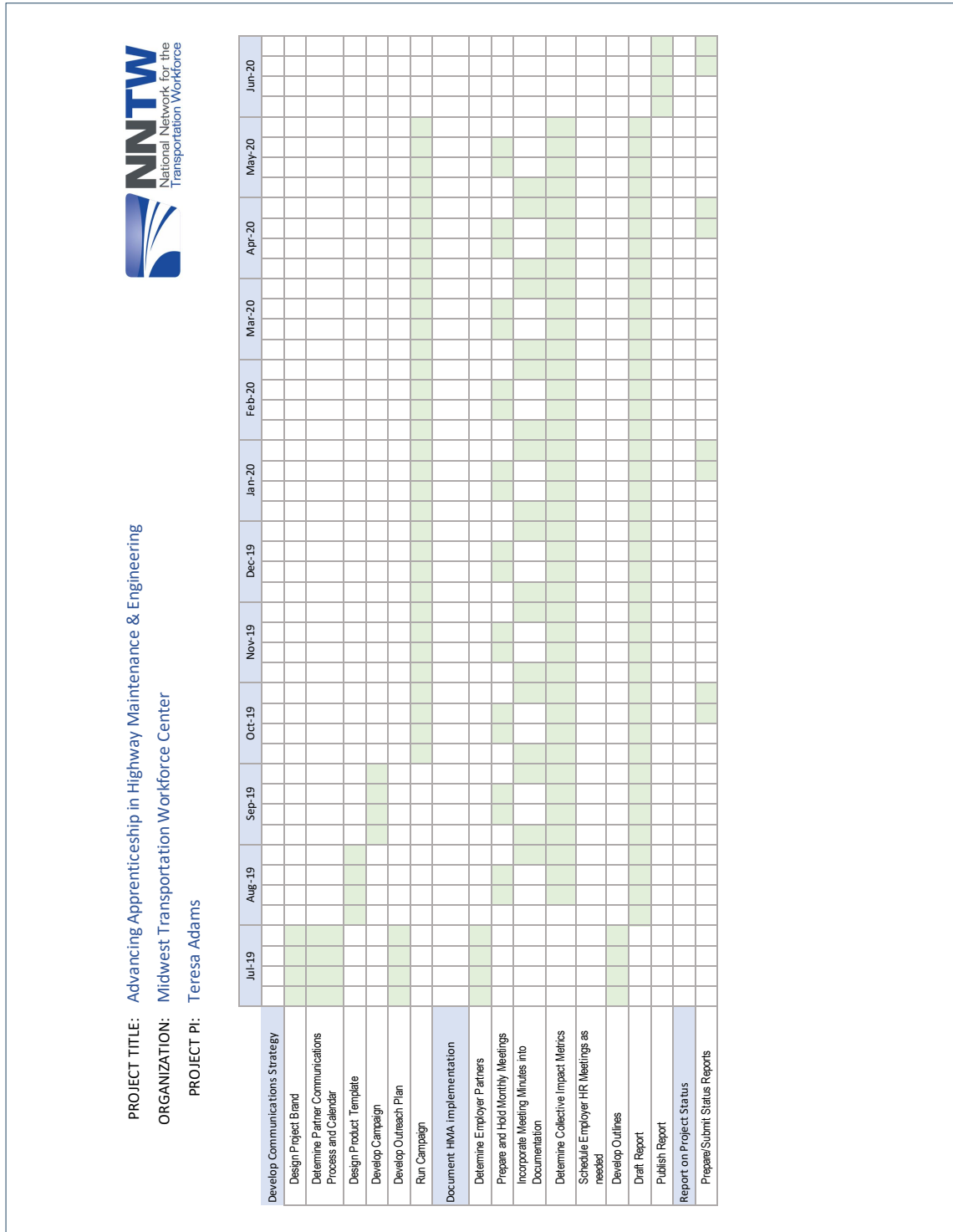
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| 1. Meet with Stakeholders | August 2020 |
| 2. Develop Curriculum | October 2021 |
| 3. Pilot Curriculum | March 2021 |
| 4. Adjust Apprenticeship Standards | January 2022 |
| 5. Develop Marketing Campaign | February 2022 |
| 6. Deploy Campaign to Inform Educators | March 2022 |
| 7. Draft Report | May 2022 |

Embed Maintenance Concepts in Youth Apprenticeship

- | | |
|---------------------------------|-------------------------|
| 1. Develop Marketing Strategy | October 2020 |
| 2. Build Databases | October – December 2020 |
| 3. Develop Metrics | October 2020 |
| 4. Implement Marketing Strategy | Ongoing |
| 5. Draft Final Report | May 2021 |

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4.8 First Year Workplan



(end of report)