

Integrating Asset Management into the Transportation Planning Process - A Case Study



Federal Highway Administration

Office of Infrastructure, Asset Management Team

1200 New Jersey Avenue, SE

Washington, DC 20590

May 2019



U.S. Department
of Transportation
**Federal Highway
Administration**

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TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. FHWA-HIF-19-001

2. Government Accession No.

3. Recipient's Catalog No.

4. Title and Subtitle: Integrating Asset Management into Transportation Planning Process – A Case Study

5. Report Date: May 1, 2019

6. Performing Organization Code: None

7. Author(s): Federal Highway Administration Transportation Asset Management Expert Task Group, Shobna Varma, StarÍsis Corporation, Gordon Proctor, Proctor Associates

8. Performing Organization Report No: None

9. Performing Organization Name and Address: Greenman-Pedersen Inc. 10977 Guilford Road
Annapolis Junction, MD 20701

10. Work Unit No.: None

11. Contract or Grant No.: DTFH61-13-A-00005

12. Sponsoring Agency Name and Address: Federal Highway Administration 1200 New Jersey Ave SE,
Washington, DC 20590

13. Type of Report and Period: Case Study May 2018 to May 2019

14. Sponsoring Agency Code: None

15. Supplementary Notes: Laura Lawndy (COR), Nastaran Saadatmand (Technical Lead)

16. Abstract: This case study focuses primarily upon how the Northeast Ohio Areawide Coordinating Agency (NOACA) integrates transportation asset management into the metropolitan planning process. The case study was produced by the FHWA Transportation Asset Management Expert Task Group (TAM ETG) as an example of how asset management can enhance the metropolitan planning process. NOACA developed a pavement management system and an asset management policy that support a focus upon improving and sustaining a state of good repair.

17. Key Words: Transportation planning, transportation asset management, statewide planning, metropolitan planning, metropolitan planning organization

18. Distribution Statement: No restrictions. This document is available to the public through the National Technical Information Service, Springfield, VA 22161. <http://www.ntis.gov>

19. Security Classification (of this report): Unclassified

20. Security Classification (of this page): Unclassified

21. No. of Pages: 17

22. Price Free

Form DOT F 1700.7 (8-72)

Reproduction of completed page authorized.



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Introduction

This case study was produced by the Federal Highway Administration Transportation Asset Management Expert Task Group (TAM ETG). FHWA established the TAM ETG as a forum to discuss changes in the way highway agencies are managing assets.¹ The structure and membership of the TAM ETG were intentionally designed to ensure interaction with key committees of the American Association of State Highway and Transportation Officials (AASHTO) and Transportation Research Board (TRB) committees. FHWA's asset management website says the TAM ETG will:

- Outline a framework for financially sustainable infrastructure and service delivery that clarifies connections between asset management, stewardship, risk management, performance management, and long-term financial planning
- Identify strategies for advancing asset management practice and influencing change within State DOTs and partnering with transportation agencies by addressing gaps in the framework, roles and responsibilities, tools, and/or workforce skills
- Provide input to FHWA, AASHTO, and TRB regarding direction, definitions, processes, tools, and templates for implementation of State and local transportation asset management plans (TAMPs)
- Develop and implement a plan for communicating the work of the TAM ETG to the transportation community

This case study focuses primarily upon how the Northeast Ohio Areawide Coordinating Agency (NOACA) integrates transportation asset management into the metropolitan planning process and does not provide implementation information on Federal Asset Management requirements under 23 U.S.C. 119 and 23 CFR part 515. For guidance on Federal Asset Management requirements, visit: <https://www.fhwa.dot.gov/asset/guidance.cfm>. Since the passage of the Federal-Aid Highway Act of 1962, the metropolitan transportation planning process has continued to evolve. The 1962 act called for a continuing, comprehensive, and cooperative planning process that was created amid the rapid expansion of the Interstate Highway System through urban areas.² Over time, the planning process expanded to include issues such as safety, air quality, environmental justice, and now asset management.

This case study examines in detail NOACA's asset management processes, and briefly summarizes processes in Michigan; Reno, Nevada; and the greater San Francisco area. Each region's approach may provide examples useful to other MPOs.

¹ Federal Highway Administration Transportation Asset Management website accessed Sept. 21, 2018, at <https://www.fhwa.dot.gov/asset/etg/index.cfm>.

² Weingroff, R. "The Battle of its Life, a brief history of the 1962 Federal-Aid Highway Act" as published in *Public Roads*, Vol. 69 N.6, May/June 2006.

The Evolution of NOACA's Pavement Management Processes

NOACA is the MPO for the five counties in northeast Ohio including Cuyahoga, Geauga, Lorain, Medina, and Lake counties. It includes Cleveland and its surrounding suburbs.

NOACA faces challenges common to many local governments and transportation agencies such as aging infrastructure, rising costs, and declining funds.³ Beginning around 2013, NOACA's asset management processes began to evolve to encourage pavement management, pavement preservation, and to promote the condition of assets to a prominent consideration in the transportation planning process.⁴ The NOACA board hired Grace Gallucci as executive director in July 2012 after she spent several years working in transportation at the Greater Cleveland Regional Transit Authority and in Broward County, Florida, as well as several years working in transit in the Chicago area. She said when she returned to Cleveland she saw it with fresh eyes and it was obvious that the infrastructure had declined and that processes were not in place to sustain it in a state of good repair.

Ms. Gallucci said the Ohio Department of Transportation (ODOT) was considering no longer collecting the optional pavement data it provided to local governments because ODOT did not think local agencies were using it. The data were for the Federal-aid routes off of the National Highway System (NHS) and off of the State system. The data were not required for the Highway Performance Management System (HPMS) nor for other Federal purposes. The data were collected voluntarily by ODOT to encourage local agencies to practice pavement management on the roads that were locally controlled. However, Ms. Gallucci urged ODOT to continue providing the data because she saw it as critical to developing an asset management program. NOACA also acquired a pavement management system to better use the pavement-condition data.

NOACA drafted its first asset management policy in 2014. That policy remained in draft form until adopted in March 2017.

The NOACA policy says in part,

Recognizing the immense need for preserving transportation investments, The Northeast Ohio Areawide Coordinating Agency (NOACA) has established a transportation asset management program to ensure the transportation network is maintained efficiently and effectively with allocated resources to allow future generations the ability to travel safely and reliably. This policy establishes the link between the agency's strategic objectives with its investment decisions.

The purpose of this policy is to adopt Transportation Asset Management as the official, institutional approach in managing infrastructure assets and making capital investment decisions at the Northeast Ohio Areawide Coordinating Agency.

NOACA's vision is to STRENGTHEN regional cohesion, PRESERVE existing infrastructure, and BUILD a sustainable multi-modal transportation system to SUPPORT economic development and

³ NOACA Transportation Asset Management Policy, accessed Sept. 21, 2018, at <http://www.noaca.org/modules/showdocument.aspx?documentid=21285>.

⁴ Based on interviews with NOACA staff and a review of its TAMP

ENHANCE quality of life in Northeast Ohio. In furtherance of the vision of NOACA, five goals guide the agency. This policy supports goal two; preserve existing infrastructure.

Transportation asset management focuses on strategic maintenance, rehabilitation and replacement of assets rather than a worst first strategy.⁵

The policy initially addressed only pavements and bridges, but NOACA's intent is to expand to additional assets over time. The policy also emphasizes the continued commitment to "complete streets" so that investments in pavements and bridges balance the needs of all users including motorists, pedestrians, bicyclists, transit vehicles, emergency vehicles, freight carriers, and even horse-drawn vehicles. Northeast Ohio has a sizeable Amish population and providing safe travel for motorized and horse-drawn vehicles is a concern in rural parts of NOACA's jurisdiction.

NOACA's policy explains that by adopting asset management, the region's decision makers will focus on the strategic treatment of assets when they need maintenance, rehabilitation, and replacement. The approach moves away from a focus on worst-first and to an integrated approach of managing assets at each stage of their lifecycle.

The NOACA policy also emphasizes the importance of the agency's pavement management system and how it can be used to improve investment decision making. The policy says the pavement management system will be used to reduce the substantial backlog of deficient pavements while also developing an optimized investment program applying a strategic mix of fixes to not rely on a worst-first approach. The policy also notes the agency's use of the National Bridge Investment Analysis System (NBIAS) to estimate needed funding levels to sustain the region's bridge inventory.

Both the draft 2014 asset management policy and the final 2017 version set the same performance measures by which the region can gauge its asset management progress.⁶ Both the 2014 draft policy and the 2017 final policy set a target of 90 percent of the NOACA-administered Surface Transportation Block Grant (STBG) funds to be dedicated to preservation of the existing system. Both the 2014 and 2017 policies set an average network pavement condition level target for the urban, local Federal-aid system of 80 as measured by the pavement condition rating (PCR). PCR is an Ohio measure of pavement condition that includes many pavement distresses such as various types of cracking. The policy also set a target of 85 percent of the pavements above a PCR of 55, which ODOT traditionally considered to be poor for lower-speed roads such as urban collectors. These measures and targets are not the ones required for the National Highway Performance Program. Instead, they are internal ones NOACA uses for project prioritization and system monitoring.

For bridges, NOACA's 2014 and 2017 policies set a target of an average general appraisal of 6.8 for structures over 20 feet in length on the urban and local Federal-aid system, including the non-Interstate NHS. It uses the National Bridge Inventory (NBI) rating scale of 0-9, with 9 being a new bridge in excellent condition. By adopting a target of keeping the inventory of bridges at a rating of 6.8, NOACA strives to keep the regional bridge inventory in a high "acceptable" range. A related measure is to have no more than 10 percent of bridge deck area in the region in poor condition.

⁵ NOACA Transportation Asset Management Policy accessed Sept. 21, 2018, at <http://www.noaca.org/modules/showdocument.aspx?documentid=21285>

⁶ The NOACA measures preceded those required in 23 U.S.C. 150.

It uses the Federal measure of poor, which is that if any one of the three components of bridge deck, superstructure, or substructure is poor, then the bridge is rated as poor. The focus on pavement management follows nearly a 20-year emphasis on improving northeast Ohio bridges, particularly in Cuyahoga County. In 1998, the average deck condition for all bridges in Cuyahoga County was 5.9 while in 2017 it had risen to 6.73, as measured by deck condition and total area.⁷

Also, in 2014 NOACA began work on a TAMP that was supported by a FHWA Accelerated Innovation Deployment (AID) Grant. The plan was intended to create a uniform vision and strategy for managing the region's 3,069 bridges and Federal-aid system lane miles. The plan was completed in July 2016. As with the measures and targets for the non-State and non-NHS pavements and bridges, this was a voluntary TAMP not intended to satisfy Federal asset management or performance management requirements. Instead, it was intended to complement NOACA's decision making and support adoption of asset management by its local agency members.

The TAMP described the region's assets and their condition to illustrate the baseline of where the region's assets stood as the asset management processes were initiated. Pavement conditions generally declined somewhat between 2006 and 2014 with an overall decrease in the Very Good category and an approximate equal increase in the Good, Fair, and Fair-to-Poor categories.⁸ Although the trends were not uniform, the overall picture was of a slight decline over those eight years.

The TAMP also documented the baseline bridge conditions using FHWA's bridge-rating scale.⁹ It noted that of Cuyahoga County's 1,328 bridges, 41.1 percent were classified as in Good condition. That leaves in Cuyahoga County alone 170 bridges that were classified as in Poor condition. The remaining structures are classified as in Fair condition. These numbers include small bridges of less than 20 feet in length that are reported in Ohio data but not reported in the NBI database. More than half of all the bridges in the region that are in Poor condition are in Cuyahoga County. Cuyahoga County is by far the largest county with the largest inventory. The disproportionate number of Poor bridges in that county reflects the generally older age of the Cuyahoga County structures. According to NBI data, the average year built for a locally owned bridge in Cuyahoga County is 1960 compared to 1984 in Geauga County and 1973 in Lake County.¹⁰ The TAMP also documented asset management objectives for NOACA. They included:

1. Establish Transportation Asset Management as a regional priority
2. Serve as a liaison for NOACA members and partners like ODOT and FHWA
3. Apply a "fix it first" mentality for projects relying on NOACA funds
4. Achieve a state of good repair for assets
5. Promote a least-life-cycle cost approach to transportation infrastructure investment
6. Expand transportation asset management to other modes

⁷ Based on comparison of National Bridge Inventory data for structures over 20 feet in Cuyahoga County.

⁸ NOACA TAMP, July 2016, p. 10.

⁹ Structure Inventory and Appraisal of the Nation's Bridges FHWA Report No. PD-96-001 December 1995 accessed Dec. 29, 2018, at <https://www.fhwa.dot.gov/bridge/mtguide.pdf>

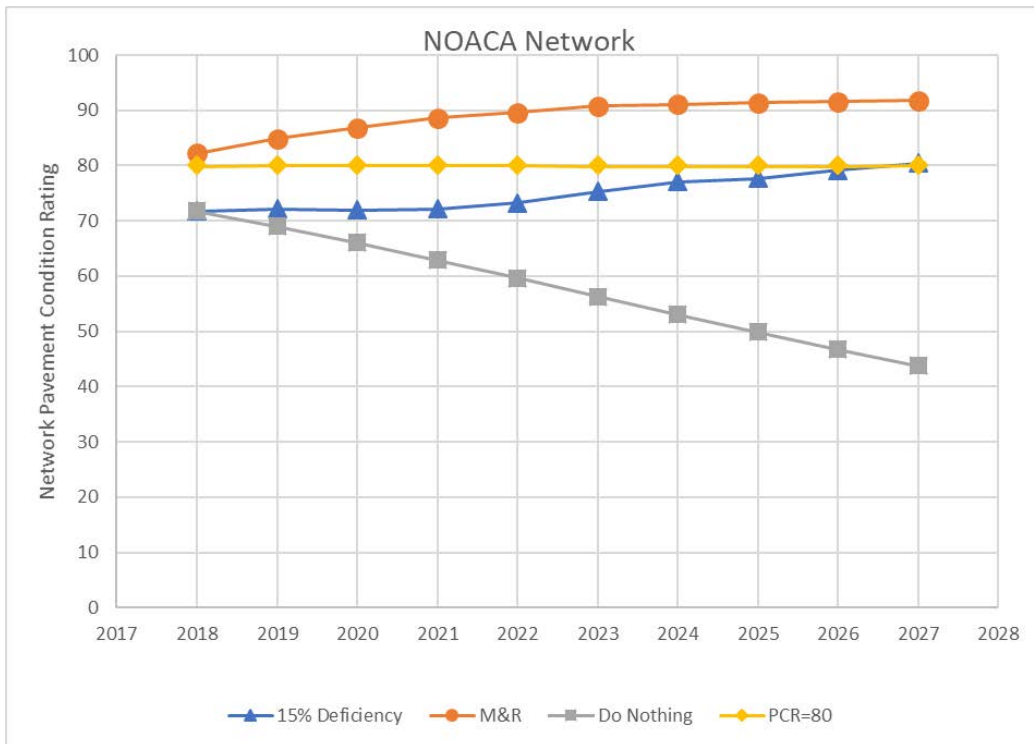
¹⁰ Calculated by an analysis of 2017 National Bridge Inventory for Cuyahoga, Lake, and Geauga counties based upon NBI item 22, Year Built.

Pavement Modeling

NOACA operates a pavement management system. With the system, it can inform its board of pavement-investment needs and it produces for each community pavement investment analyses. Figure 1 illustrates the results of model runs for the locally managed NOACA network, which includes the Federal-aid routes not managed by ODOT. The four scenarios illustrate the average pavement condition rating (PCR) under different investment levels. The “Maintain 15 percent Deficiency” strategy attempts to maintain the total lane-miles with PCR below the acceptable level at no more than 15 percent. The “M&R” program determines the optimal preventive maintenance and rehabilitation strategy for each segment and its recommended implementation year based on the considered decision tree. The “Do Nothing” scenario illustrates the consequences of making no pavement investments. The “Maintain an Average Network PCR of 80” scenario applies a set of pavement treatments in order to keep the roadway network weighted average PCR more than, or equal to 80, over the study period. With each scenario, the model also produces a cost estimate. The 10-year cost for the 15 percent deficiency strategy is \$3.5 billion, the M&R strategy \$3.1 billion, and the PCR = 80 strategy would cost \$3.6 billion over 10 years.

The scenarios are aggregated for the NOACA Board to understand investment needs and pavement-condition trends. The results also are broken out for each community. The scenarios allow each community to understand the total amount of pavement investment needed, and what types of treatments, to achieve the different scenario objectives. For example, NOACA’s objective is to have no more than 15 percent of the pavements below its targets. The targets are a PCR of at least 50 for collectors and a PCR of 55 for arterials. The “15 percent deficiency” scenario informs the NOACA board of how much investment is needed across the region to maintain that target. The disaggregated reports inform each community of how much investment it must make, and of what types of treatments, to sustain the 15 percent target.

Figure 1. Pavement investment scenarios for NOACA region locally managed roads.



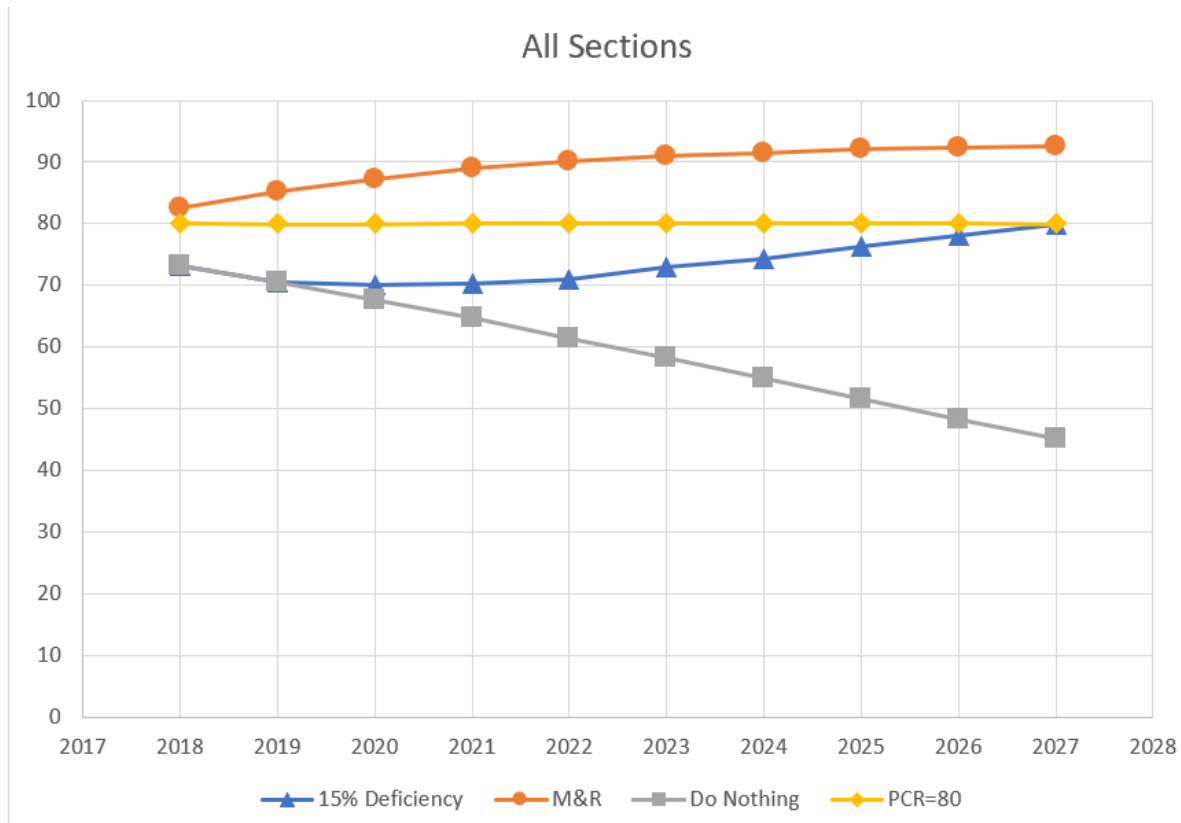
Source: NOACA

NOACA only controls about \$35¹¹ million annually that could be spent on pavement, but the pavement model indicates that at least \$250 million is needed in 2019, increasing to \$447 million, by 2027 to maintain the 15 percent target across the locally managed NOACA region Federal-aid network.

¹¹ Ohio Department of Transportation MPO & Large City Capital Program Report 2017 p.15.

Figure 2 illustrates similar pavement investment scenarios for all State and locally managed Federal-aid roads in the NOACA region. The same scenarios were run as in Figure 1 except the scenarios in Figure 2 include all Federal-aid routes including the freeways and arterials managed by ODOT. Other than the “Do Nothing” scenario, the costs for these scenarios range from \$5.1 billion to almost \$5.8 billion.

Figure 2. Pavement investment scenarios for all State and locally managed Federal-aid roads in the NOACA region.



Source: NOACA

Other modeling was conducted earlier for NOACA’s TAMP and that modeling validated NOACA’s asset management approach. It showed that to maintain an average network level PCR of 75 using a worst-first approach would cost \$2.5 billion over 10 years while a preservation approach would cost approximately half of that or \$1.3 billion. Although the scenario forecasts lower future conditions if investments are not increased, it also confirms that less additional investment is needed if a preservation approach is adopted.

For the 2016 TAMP bridge analysis, NBIAS was used. Scenarios were conducted of how much investment was needed to achieve the 2016 TAMP’s NHS bridge targets, to achieve targets on the entire NHS, and to achieve targets on the small bridges of less than 20 feet that are inspected and reported in Ohio. A funding gap of approximately \$120 million annually was identified to keep all bridges, including the small ones of less than 20 feet, in good or fair condition.

Progress Building from the TAMP

The development of the pavement management system and the production of the TAMP complemented other NOACA asset management activities. Advisory boards of technical experts such as county engineers and city service directors were formed to help set asset management guidance, interpret the pavement data, and develop procedures for selecting projects based upon asset management principles. Executive Director Gallucci said in the past project selection was based upon more informal factors such as which communities had projects ready, and how long communities “had waited in line” for funding. Now, the pavement data and asset management policies strongly influence project selection. Projects are prioritized based upon how they help optimize pavement conditions with the funds NOACA controls.

The entire process also has strengthened ties between the MPO, ODOT, and the technical staff of the communities who serve on the asset management advisory boards. Each of the five counties is represented on a technical advisory board to help with the engineering and technical expertise needed for asset management. Elected officials serve on policy groups that help set the asset management policies.

While ODOT collects the pavement data and provides technical assistance, NOACA staff operate the pavement model. NOACA has a staff member with expertise in modeling who helps operate and customize the pavement model.

The region’s decision makers now accept asset management as the best way to manage infrastructure. In the early years of the effort, not everyone agreed that investing in a pavement model and focusing on asset management should be priorities for NOACA. Some local governments generated pavement project lists that were very different than what the model produced. It took negotiation and education to convince all decision makers of the benefits of asset management. Now, however, the region has accepted the concept of asset management as the best way to achieve and sustain a state of good repair.

The asset management focus has influenced many activities and attitudes within the region. NOACA intends to develop a long-range plan based upon achieving a state of good repair on the entire network. It wants to identify the types of investments and the dollar amounts needed to sustain the region’s assets. The TAMP estimated the value of the region’s Urban and Local roads to be approximately \$5 billion consisting of approximately \$3.8 billion for local system roads and \$1.2 billion for Urban system roads. The asset management effort has increased the region’s emphasis upon the value of its assets and the integral role they play in the region’s economy. NOACA promotes asset management as the means to preserve the network consisting of the regional assets that serve all the communities. The approach has led to more recognition that keeping arterials and collectors that serve the region in good condition is important to all communities. It has contributed to recognition that projects that preserve the arterials serve the communities that may not be directly affected. Instead of thinking of only projects within their community, the asset management effort has led officials to recognize the importance of maintaining the region’s entire network.

Although the modeling indicates that conditions will continue to decline slightly if only the current level of investment is available, ¹² the rate of decline has slowed, and many routes are noticeably improved.

¹² NOACA Transportation Asset Management Plan, p. 22.

The region's assets would have been worse than they are today if not for the strategic investments already spurred by the asset management focus. When the TAMP was first developed, it spurred an initial pavement investment of about \$40 million in NOACA-controlled funds. The \$40 million included some unobligated balances which are now spent. Now, of the funds that NOACA controls annually, about \$35 million annually goes toward pavement preservation and investment. Many of the remaining projects are funded with Transportation Alternative or Congestion Mitigation funds that are not eligible for pavement projects. With its pavement model, NOACA now can calibrate what strategies and projects are needed to achieve an acceptable network level of an average PCR of 55 or 60. Although that level is not as high as the average PCR of 80 that the TAMP indicates would be preferable,¹³ officials at least can plan and program projects to maximize the funds they do have.

ODOT and NOACA have completed their collaboration on target setting under the Federal performance management requirements in 23 U.S.C. 150 and are working closely on the region's asset management program. They share data, help communities with technical advice, and jointly support the region's adoption of a strategic approach to programming based upon asset management principles.

Local officials are now more aware than before of the conditions on the NHS and Interstates that ODOT manages while ODOT is more aware of the conditions on the Federal-aid system that the locals manage. ODOT has for many years used performance measures, now called critical success factors, to manage its operations. The close collaboration with NOACA now provides both organizations better understanding of the other's objectives, measures, and targets.

How NOACA Uses Its Pavement Data

NOACA produces pavement condition reports for each community and for the entire region. The data are converted into customized reports and maps for each community. As Figure 3 shows, there are substantial amounts of poor pavement on the Federal-aid system in Cleveland. Figure 3 is a screen shot from NOACA's geographical information system (GIS) web portal. It shows pavements across the region color coded by condition. A standard color coding of red indicates the pavement condition rating is below 55, yellow is above 55 but below 70, and green is above 70. Light blue indicates preservation is warranted and dark blue indicates no treatment is needed.

¹³ NOACA Transportation Asset Management Plan, p. 22.

Figure 3. A pavement condition map of Cleveland and some of its surrounding communities.



Source: NOACA

The 2016 pavement report prepared for the City of Cleveland is based on NOACA's previous pavement reporting process that produced primarily backlog reports. Moving forward, NOACA wants to produce with its pavement model more forward-looking reports to indicate how the community can optimize its network with available funds.

However, even the backlog reports include substantial information that communities can use to pursue good pavement management practices. Figure 3 shows not only the condition of each route but also the pavement model's recommended treatment. Treatments range from major rehabilitation, minor rehabilitation, preventive maintenance, routine maintenance or no action needed.

The pavement model captures the many distresses on the Cleveland pavements and assigns the appropriate treatment needed to correct them. For Cleveland, the model indicates that substantial major rehabilitation is needed because of the severe distresses. To treat the backlog appropriately would require \$116.2 million in rehabilitation, \$25.8 in minor rehabilitation, \$15.9 million in preventive maintenance, and \$3.9 million in routine maintenance. Those amounts are only for the Federal-aid system and do not account for the much larger network of city streets.

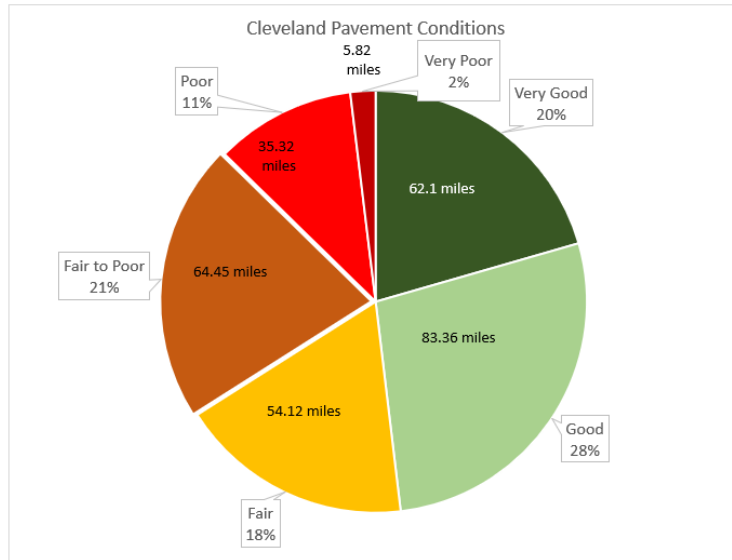
Recommended treatments are shown in Table 1 and a summary of conditions are in Figure 4.

Table 1. An example of recommended treatments and costs for roadway sections

Street Name	Route Name	From Log Point	To Log Point	Length (Miles)	Width	Repair Alternative	Estimated Cost
ABBEY (0.0 - 0.44)	CCUYCR00762**C	0	0.44	0.44	42	Routine Maintenance	\$32,896
ABBEY (0.44 - 0.6)	CCUYCR00762**C	0.44	0.6	0.16	42	No Repair Needed	\$0
ABBEY (0.60 - 0.66)	CCUYCR00762**C	0.60	0.66	0.06	42	Routine Maintenance	\$4,459
ADDISON (0 - 0.31)	CCUYCR00792**C	0.00	0.31	0.31	28	No Repair Needed	\$0
ADDISON (0.31 - 1.10)	CCUYCR00792**C	0.31	1.10	0.79	29	Minor Rehabilitation	\$136,656
AEROSPACE (1.08 - 1.12)	CCUYCR00850**C	1.08	1.12	0.04	48	Routine Maintenance	\$3,400
AEROSPACE (1.12 - 2.18)	CCUYCR00850**C	1.12	2.18	1.06	70	Routine Maintenance	\$131,280
AETNA (0 - 1.12)	CCUYCR00766**C	0.00	1.12	1.12	24	Preventative Maintenance	\$106,343
AIRPORT (0.26 - 1.12) - A	CCUYCR00237**C	0.26	1.12	0.86	72	Preventative Maintenance	\$242,120
AIRPORT (0.26 - 1.12) - B	CCUYCR00237**C	0.26	1.12	0.86	72	Preventative Maintenance	\$242,120
AMTRACK	CCUYCR00781**C	0.00	0.02	0.02	24	Preventative Maintenance	\$1,899
BALTIC (2.18 - 2.30)	CCUYCR00435**C	2.18	2.30	0.12	28	Preventative Maintenance	\$13,293
BALTIC (2.30 - 2.67)	CCUYCR00435**C	2.30	2.67	0.37	28	Major Rehabilitation	\$597,547
BALTIC (2.67 - 2.91)	CCUYCR00435**C	2.67	2.91	0.24	28	No Repair Needed	\$0

Source: NOACA

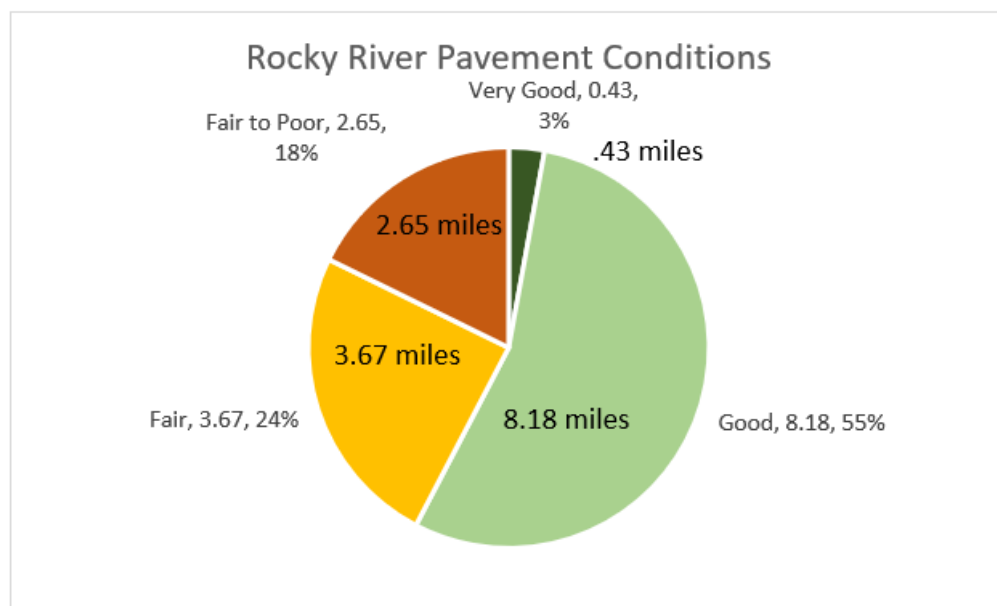
Figure 4. A summary of Cleveland pavement conditions.



Source: NOACA

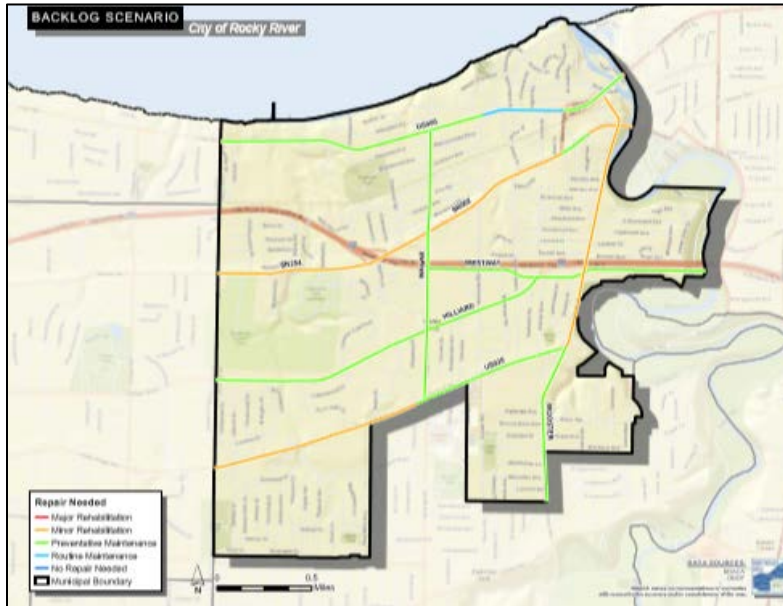
Pavement conditions and investment needs in Cleveland differ considerably from the smaller community of Rocky River. Its much smaller network and higher conditions are seen in Figures 5 and 6. It has a small Federal-aid network of only 14.9 miles and has no pavement in poor condition. The NOACA pavement report for Rocky River indicates to appropriately address its pavement backlog that \$1.1 million is needed for minor rehabilitation, \$1.7 million for preservation, and \$32,181 for routine maintenance.

Figure 5. Rocky River's pavement conditions.



Source: NOACA

Figure 6. Rocky River's conditions mapped.



Source: NOACA

Another example of how the pavement management system can help prioritize the types of treatments needed is shown in Figure 7. It maps the conditions of county-managed roads in Geauga County, a largely rural county east of Cleveland. Most are in good condition and need only preservation treatments to keep them in a state of good repair. The NOACA report for Geauga County recommends \$809,000 in major rehabilitation, \$3.6 million in minor rehabilitation, \$7.2 million in preventive maintenance, and \$365,000 in routine maintenance.

Figure 7. Geauga County's conditions.



Source: NOACA

NOACA Summary

The NOACA example illustrates how an MPO can embrace asset management and incorporate it into the transportation planning process. NOACA defines the level of acceptable asset conditions and it identifies the investments and treatment types necessary to achieve those levels. Although the region's bridges have improved, pavements still appear to be on a downward trajectory if current spending levels continue. However, the pavement management model and NOACA's practices now can quantify for decision makers what steps are necessary to reverse that trend and to keep the region's assets in a state of good repair. As NOACA develops future transportation plans and programs it can make better informed decisions thanks to its asset management program.

Other Examples of Asset Management in the Planning Process

In addition to NOACA, other planning agencies are developing plans and programs to embrace asset management. Two examples are briefly summarized below.

Michigan Asset Management Assistance

The Michigan DOT and the Michigan Transportation Asset Management Council (MTAC) provide training and management system assistance to the State's local governments. The 2016 statewide annual report notes that the Bridge Condition Forecasting System (BCFS) estimates future condition of bridges in Michigan using deterioration rates, project costs, expected inflation, and planned fix strategies. The modeling indicates the combined overall condition of all the State's bridges (both on State trunk lines and on bridges owned by counties, cities, and villages) is expected to decline after 2016. By 2025, nearly half of the progress made toward improving bridge conditions since 2004 could be lost. In addition, the condition and forecast data show the local bridge program could materially benefit from more bridge-owning agencies actively adopting good capital preventive maintenance.

For pavements, the MTAC forecasts that conditions on the Federal-aid system will decline even with the additional revenue approved by the State legislature. Past trends show steady declines in the condition of Michigan's Federal-aid pavements, and they are modeled to continue to decline.

The MTAC provides training and asset management tools to local government to encourage them to use local and Federal-aid funds to adopt asset management principles.

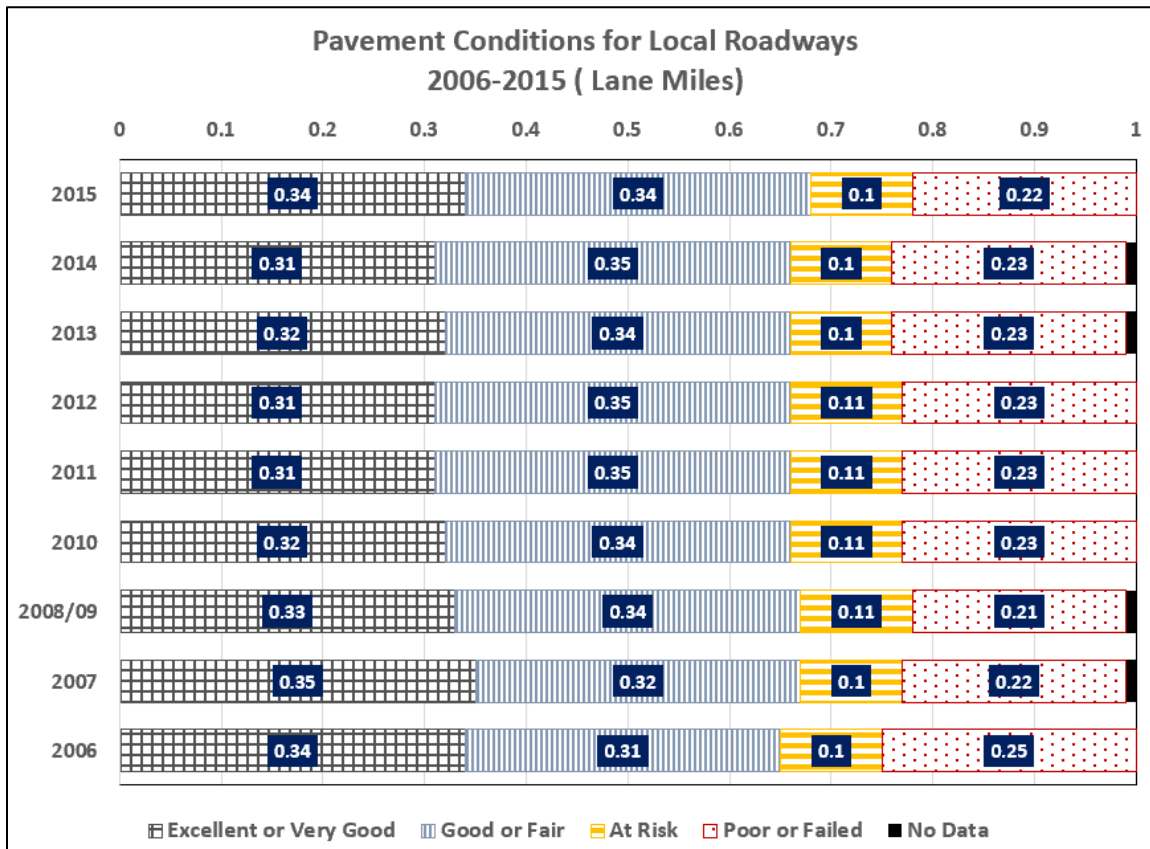
San Francisco Area Pavement Management System

One of the oldest and most extensive asset management programs within an MPO is the pavement management system at the Metropolitan Transportation Commission (MTC) in the greater San Francisco area. Its origins extend to 1982 when the MTC conducted a study of local street and road maintenance needs and the funding shortfalls that communities face in maintaining their roads. That led to MTC developing a regional pavement management system to help the communities better manage their roads. The management system led to policies that incorporated asset management into the regional

planning process.

The MTC invested not only in a pavement management system but also into training for its local communities. It provided more than 500 pavement management training or technical assistance grants to local governments so their staffs could use the MTC-developed pavement management system. Now, every community in the region uses a pavement management system. To be eligible for MTC-controlled funds, a community project must be developed using the community’s pavement management system and must be recognized as cost effective.¹⁴ The MTC certifies the pavement management systems to ensure they use adequate, current data, can assess distresses, and can calculate needs to maintain pavements for at least the next three years.

Figure 8. MTC’s pavement condition trends.



Source: MTC

Since 2008, the MTC and other communities have participated in an annual assessment of pavement conditions in California’s cities and towns. For the communities served by MTC, the MPO’s pavement management system regularly produced condition data at the community and regional level. The MTC data and pavement management system served as the analytical engine for the reports that documented the need for substantial additional investment. That data played a role in finally convincing California legislators in 2017 to pass a substantial increase in infrastructure funding. The large infrastructure package includes \$1.5 billion annually for the next 10 years for California’s local roads.

¹⁴ Personal communication with MTC staff.

The MTC pavement management system also plays an important role in how the MPO programs its Federal-aid funds. In the early days of the effort, the MTC told its communities that they need to evolve to a performance-based approach to allocating Federal funds to projects. That evolved to requiring that projects from local communities need to derive from their pavement management systems and be shown to be cost effective. The MTC staff reviews the projects and pavement management data and ensures the projects are eligible for Federal funding based upon their functional classification.

As the asset management approach evolved, it became a strong influence on the long-range plan. The long-range plan emphasized that the region's system is built out and that a strong focus upon preserving the extensive asset inventory was needed.

The asset management focus in the long-range plan led to programming policies that incentivize preservation. Communities are rewarded by MTC's policies when they practice good pavement management. To get projects funded, local agencies need to show that they are increasing the preservation of their assets. The MTC tracks the last three years of a community's funding to check how much it actually spent on pavement preservation. The policy has led to a significant change in the types of projects funded. It also contributed to more Federal-aid funds being used for the more-costly rehabilitation of local arterials when rehabilitation is the cost-effective treatment called for by the pavement management system.

MTC staff say the overall intent is to empower local agencies to stretch their dollars with pavement preservation strategies. Communities receive help in operating the pavement management system, they are rewarded during project selection decisions by MTC for investing in preservation, and the annual pavement data contributes to statewide advocacy for increased State support for local investments. MTC also wants to address additional assets besides pavements. It is trying through its safety program to address sign reflectivity and keep the region's signs in good condition. It also is attempting to support management of curb ramps through data collection and improving them as roads are paved. MTC staff say a major constraint is money for data collection. Money for data collection either must come from local governments or at the expense of projects. An issue for the expansion of asset management to additional asset classes will be how to pay for the data collection and analysis that is needed.

Reno Nevada Area Pavement Management

Another long-standing regional pavement management program exists at the Regional Transportation Commission (RTC) which serves as the Reno, Nevada, area MPO. In 2002, community leaders responded to deteriorating roads and put on the ballot a local fuel tax increase to pay for local road and transit maintenance that voters approved. That also led to the MPO creating a pavement management system and developing technical committees to use the data to prioritize the maintenance of the region's pavements. Since the maintenance fund enactment, the RTC has coordinated a regional pavement management and funding program that keeps conditions at a high level. The region set a target to have an average regional pavement condition index (PCI) rating of 70, and it has achieved a regional PCI of 87.¹⁵ Pavement conditions became so good that the region has moved into a preventive maintenance mode. It also allowed some funds to be transferred to other uses for several years. For the past two years, some of the funds were transferred to capacity projects with the understanding that starting in 2019 they will revert to the pavement preservation program.

¹⁵ Personal communication with RTC staff.

The RTC and local governments use a pavement management system to create a regional pavement preservation program. The management system provides a regional assessment of pavement conditions and investment needs. It also helps prioritize projects. The regional process emphasizes preventive maintenance strategies such as slurry seals to keep pavements in good condition. It also provides a pavement reconstruction program for pavements that are beyond the point of benefiting from preventive maintenance.

The region's pavement program also complements the move to a "complete streets" approach. Slurry seals are often used which allow the lane delineation to change and provide room for bike lanes or to put the road on a "road diet."

Conclusion

As infrastructure continues to age, other MPOs may wish to understand how NOACA and other agencies are integrating transportation asset management into the transportation planning processes.

Abbreviations and Acronyms

AASHTO	American Association of State Highway and Transportation Officials
AID	Accelerated Innovation Deployment Grant
BCFS	Bridge Condition Forecasting System
GIS	Geographic Information System
FHWA	Federal Highway Administration
MPO	Metropolitan Planning Organization
MTAC	Michigan Transportation Asset Management Council
MTC	Metropolitan Transportation Commission
NBI	National Bridge Inventor
NBIAS	National Bridge Investment Analysis System
NOACA	Northeast Ohio Areawide Coordinating Agency
ODOT	Ohio Department of Transportation
PCI	Pavement Condition Index
PCR	Pavement Condition Rating
RTC	Regional Transportation Commission
STGB	Surface Transportation Block Grant
TAM ETG	Transportation Asset Management Expert Task Group
TAMP	Transportation Asset Management Plan
TRB	Transportation Research Board