



# CITY OF WARREN

## Van Dyke Corridor Plan

Final Draft for Adoption  
December 12, 2023



# Acknowledgments

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B R   
Beckett & Raeder



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Van Dyke Avenue Heading North at Westminster Avenue

# 1 ASSESSMENT

## OVERVIEW & PURPOSE

The Warren Van Dyke Corridor Plan study area spans from Eight Mile Road on the south to Stephens Road—along the southern limits of the City of Center Line—in the north. The plan provides an opportunity to make significant progress toward the “South Warren” goal from the 2021 Master Plan: “To redevelop the area along Van Dyke south of Center Line to create a vibrant district for businesses and residents alike.” The purpose of the plan is to increase consistency of the built environment along the corridor, to improve its economic return, and to facilitate non-motorized access to its business and recreation assets.

Recommendations in the plan were developed based on results from extensive community engagement efforts, high level traffic analysis of the corridor, and best practices for improving high-speed, vehicle-centric corridors. The plan examines vehicular traffic considerations such as volume and level of service, and focuses on multimodal integration and land use revitalization. The proposed design focuses on enhancing safety, accessibility, and enjoyment for non-motorized users while beautifying and strategically activating areas to support more diversity of uses.

### Physical Assessment and Summary

Van Dyke Avenue is a five-lane roadway consisting of two lanes of northbound traffic and two lanes of southbound traffic, a shared center turning lane, and north and southbound bicycle lanes. The north- and southbound lanes are 11 feet wide with a center

turning lane ranging between 10.5 feet to 12 feet wide. The bicycle lanes consist of a 6-foot painted barrier and a 6-foot bike lane. The average sidewalk width along the length of the corridor is 13 feet, with intermittent 4-foot-wide tree wells.

Van Dyke Avenue is predominantly paved with sections of furnished areas, located mostly next to bus stops. There is a mix of commercial development along Van Dyke Avenue and dispersed vacancies in the form of vacant lots and buildings. Vehicular access to development is accommodated by parking lots with one to two drive approaches depending on their proximity to a cross-street. There is no on-street parking along the corridor.

The Van Dyke Avenue Corridor (M-53), between Eight Mile and Stephens, has been identified as a good contender for a main street in Warren and ongoing development plans. These development plans are geared toward commercial, entertainment, and denser housing to activate this streetscape. A physical assessment of the Van Dyke Corridor conducted for this study is summarized in the following section.

### Existing Conditions and Function

Existing physical conditions of Van Dyke Avenue’s street environment affect its visual impact, safety, and diversity of users. Analyzing the character of the existing corridor is crucial in developing the most impactful design recommendations. In order to effectively dissect existing form and function to improve the corridor’s design, this physical assessment was

**Figure 1-1: Typical Section**

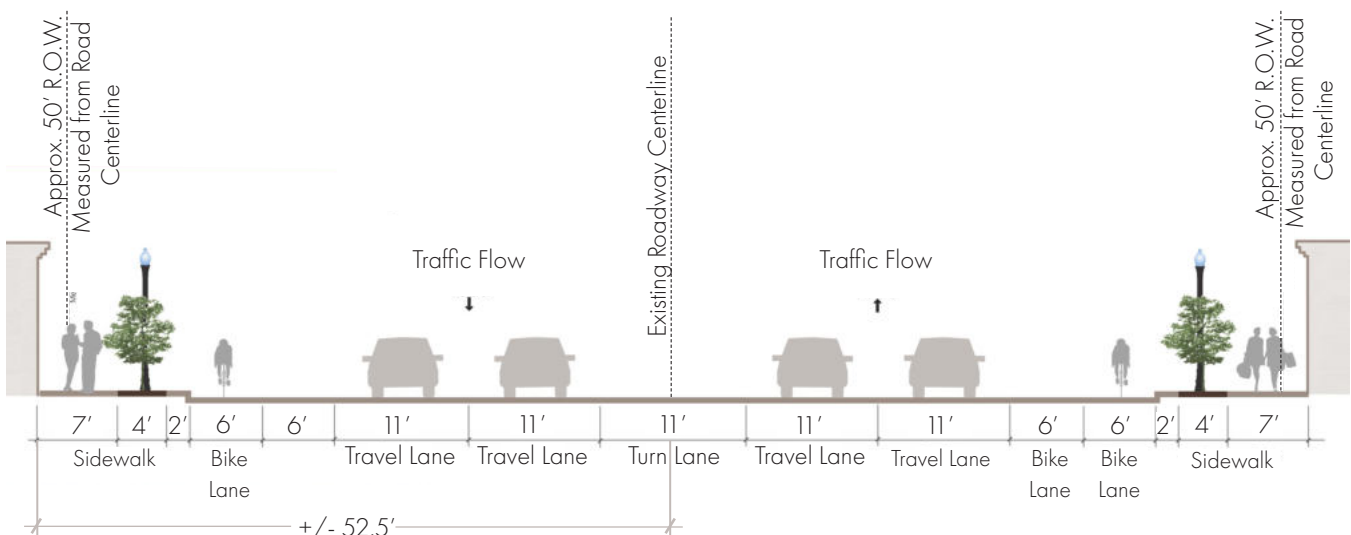
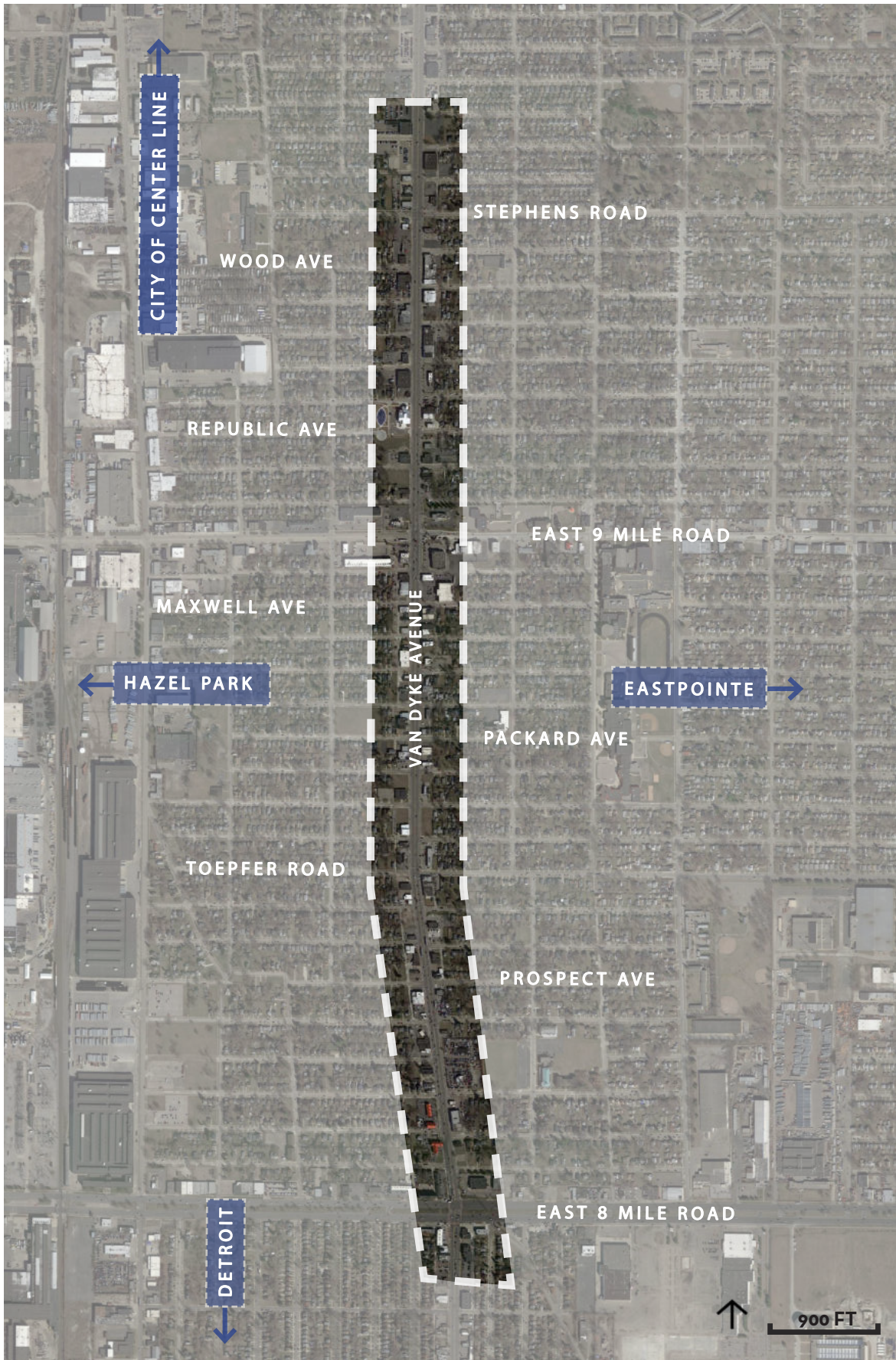


Figure 1-2: Van Dyke Corridor Study Area





broken into categories: character; vegetation; lighting and overhead electric; bus stops, crosswalks, and bicycle lanes; and maintenance conditions.

### Character

The corridor currently exhibits a blend of new and deteriorating streetscape features that contribute to an inconsistent character. A combination of well-maintained building facades, new sidewalks, and new development exists alongside multiple styles of streetscape furnishings, mature and dying street tree plantings, and deteriorating sidewalks. There are few distinct shifts in character throughout the entirety of the study area; rather, block by block differences in streetscape quality result in a conflicting character traits that affect the overall user experience of this space.

More homogeneous streetscape character is evident between Continental Avenue and Lozier Avenue, with the development of a mini police station, high tech library, City Administration Office, and outdoor play area at Civic Center South.

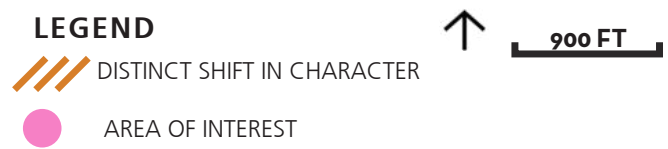
### Vegetation

Recent investment in new trees along Van Dyke Avenue is a great foundation for the long-term improvement of the streetscape. Mature street trees are conducive to an improved feeling of pedestrian safety and can, to a minimal extent, help to address community-identified issues of flooding and polluted stormwater runoff. Maintenance of young street trees is paramount to cultivating a lush, green, and functional downtown corridor.

At the time of this physical assessment, a number of young street trees were dead or dying, tree grates were not always present, and there were many tree wells with no plantings. Young street tree plantings were dominant within the right of way, and no herbaceous plantings and understory plantings were identified. More effective stormwater management may be accomplished through expanded planting areas and a greater diversity of planting materials consisting of both overstory and understory vegetation. A greater diversity of vegetation directly correlates with enhancing the ecological value of this densely developed urban space by providing habitat and refuge for wildlife.

There was minimal to no screening on private development parking areas. The look and feel of this vehicular-centric space can benefit from screening

Figure 1-3: Van Dyke Avenue Corridor Character



parking lots and areas containing unsightly utilities. Consistency of green screening plantings along the length of Van Dyke Avenue could also positively contribute to stormwater runoff mitigation and habitat provision as previously highlighted.

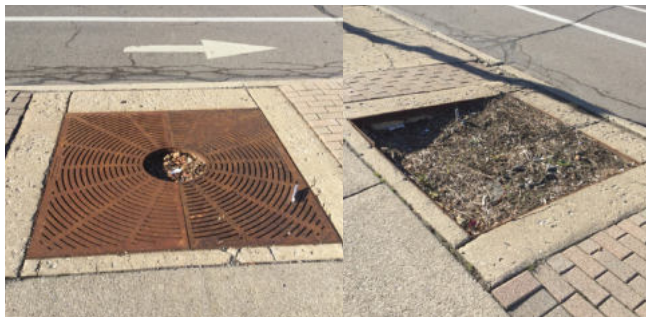
Numerous vacant lots exist within the study area. These sites show evidence of continued maintenance and mowing, and present opportunities for further enhancement of the greenspace along the corridor. Improvement of these areas can enhance the pedestrian experience and may include activation by way of strategic infill development, micro-parks, community gardens, and community art installations. These vacant spaces can also provide pockets of greenspace that support wildlife habitat and stormwater and flood management.

### Lighting & Overhead Electric

Existing post-top streetlights and diverse vehicular-scale overhead lighting are present at major signalized intersections. Seasonal maintenance of some light fixtures is evident given the presence of annual planting boxes during the spring and summer and garland wrappings during the winter months.

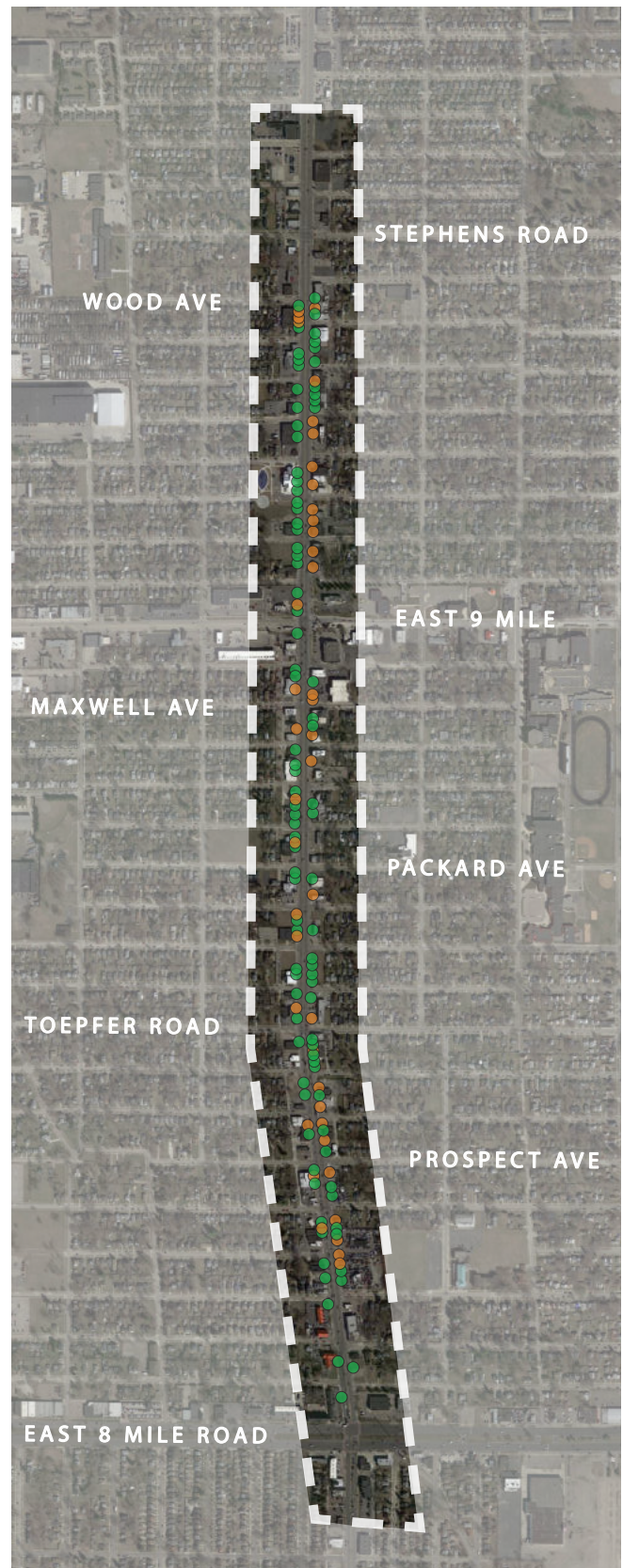


Healthy existing street tree within the corridor



Existing unused tree wells within the corridor

Figure 1-4. Existing Street Trees & Tree Wells



### LEGEND

- HEALTHY STREET TREE
- UNUSED TREE WELL OR DEAD TREE



900 FT

There are several overhead electric crossings along the study area, namely across Eight Mile, Jackson Avenue, Toepfer Road, Chalmers Avenue, Dodge Avenue, Paige Avenue, and Stephens Road. In addition to being unsightly, these overhead crossings prevent the use of canopy-forming street trees in these areas.

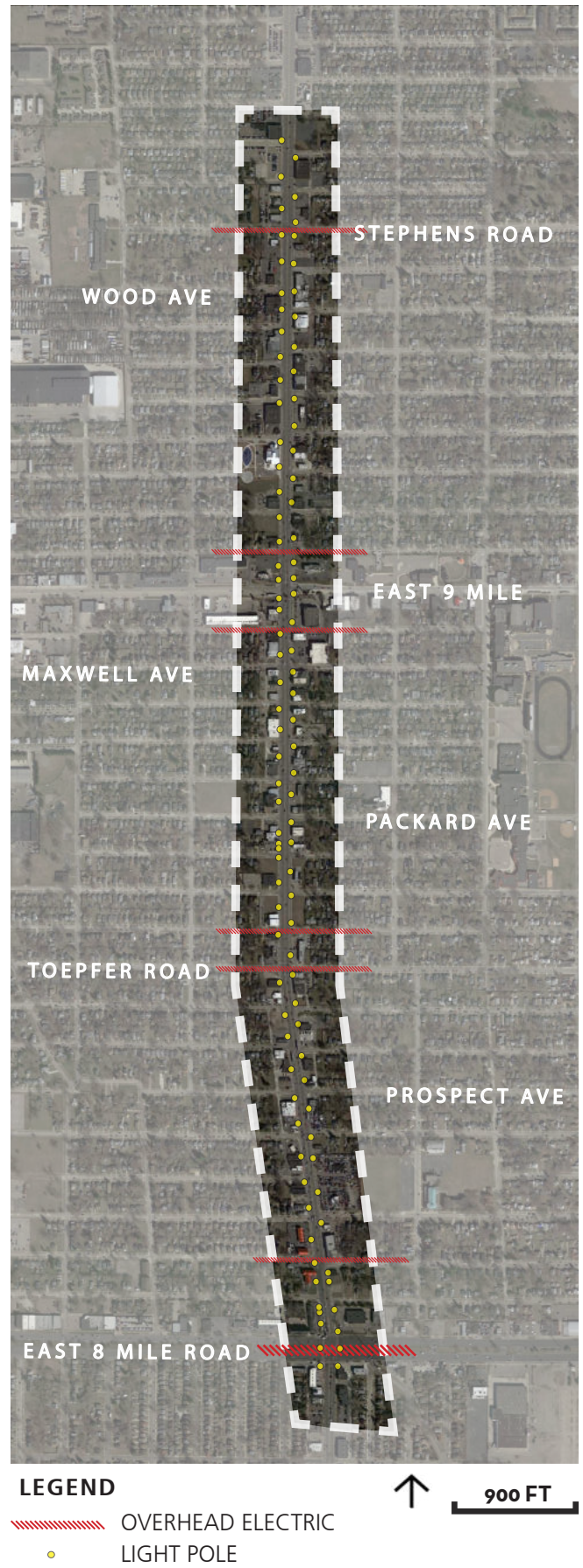
*Bus Stops, Bike Lanes, and Crosswalks*

Van Dyke Avenue has consistent placement of bus stops along its corridor, equipped with site furnishings that support use of public transportation like benches, bike hoops, and trash receptacles. There are three bus shelters along the corridor located on northbound Eight Mile, and east- and westbound Nine Mile. The style of site furnishings is inconsistent among the



Existing lighting fixtures along the corridor include street-scale lighting (cobra light fixtures) and pedestrian scale lighting (post-top light fixtures)

**Figure 1-5: Existing Overhead Electric & Lighting**



bus stops and, in some cases, among multiple trash receptacles at the bus stops. Aesthetic cohesion of site furnishing styles will improve the corridor’s form.

Bicycle lanes along the study area are identified with green pavement markings at the intersection of Eight Mile, and northbound Nine Mile at the Iron Belle Trail linkage. These lanes consist of a 6-foot pavement marking barrier and a 6-foot bicycle lane. Improvements to bicycle lanes may include a more distinct physical barrier between the bicycle lane and vehicular lanes, such as bollards, a vegetative barrier, or highlighting the entirety of the length of the bicycle lane by painting it as is seen at several intersections.

Signalized crosswalks exist at the intersection of Van Dyke and East Eight Mile, Westminster Avenue, Toepfer Road, Hupp Avenue, East Nine Mile, and Stephens Road at traffic lights. There are currently no signalized or non-signalized mid-block pedestrian crossings, requiring pedestrians to walk several blocks or more to safely cross Van Dyke Avenue. Improvements and activation of this downtown corridor may include more pedestrian crossings to ensure a safer pedestrian experience.



(Above) Existing unprotected bike lanes and (below) existing painted bike lanes at Van Dyke and 8 Mile & Van Dyke and 9 Mile Roads.

Figure 1-6: Existing Bus Stops, Bike Lanes & Crosswalks



**LEGEND**

-  BUS STOP
-  PAINTED BIKE LANE
-  UNPAINTED BIKE LANE
-  EXISTING CROSSWALK (SIGNALIZED & NON-SIGNALIZED)

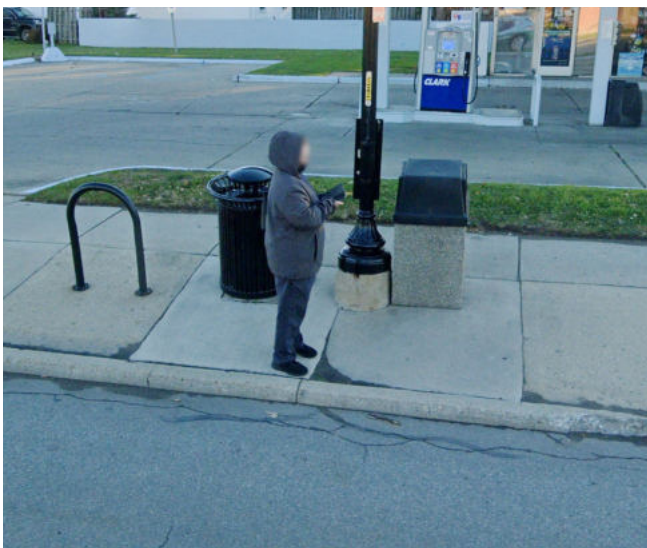




Existing pedestrian crosswalk striping at Van Dyke and Toepfer.



Existing bus shelter northbound Van Dyke Avenue at 9 Mile Road



Existing bus stop along northbound Van Dyke Avenue at Studebaker Ave

Figure 1-7: Existing Sidewalk Conditions



**LEGEND**

- POOR SIDEWALK CONDITION
- UNSCREENED PARKING



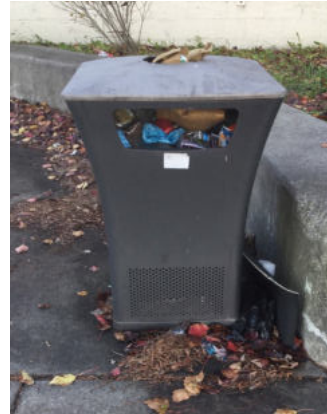
### Maintenance Conditions

There is evidence of inconsistent maintenance along Van Dyke Avenue which can be seen in the variety of sidewalk quality. In some places, primarily close to tree grates and heavily used drive approaches, the sidewalk is in disrepair, with cracked slabs and differential settlement presenting trip hazards. Addressing areas of failing sidewalks and drive approaches along Van Dyke is necessary to create a safe, accessible, and beautiful community environment.

The various levels of façade maintenance evident along the corridor are related to business vacancies. Investment in façade improvements will enhance the look and feel of the Van Dyke Avenue Corridor, and support activation of new downtown commercial, recreational, and residential uses.



Areas of poor sidewalk condition within the study area



Multiple mismatched and duplicated trash receptacles along the corridor

### Road Classification and Traffic Volumes

#### Master Plan Transportation Typologies for the Van Dyke Corridor

The Warren Master Plan classified the city's streets according to "typology," a general categorization that includes a physical description, the intended users, and certain defining characteristics to serve those users. The Van Dyke Corridor in the study area was classified as a "Main Street".

#### Main Street

As the name plainly states, this is the principal street of activity in a city, typically the heart of the downtown. Main Streets have vibrant streetscaping that are designed to handle multi-modal transit and business owners' needs (like product delivery) in addition to vehicular traffic. Warren does not have a traditional Main Street because it does not have a traditional downtown. Van Dyke Avenue (between Eight and Nine Mile Roads or between Twelve and Thirteen Mile Roads) and Common Road (which connects to the backside of the Civic Center) could be good contenders for a Main Street due to their adjacency



Multiple styles of bicycle racks used along the corridor

**Figure 1-8. 2020 Average Daily Traffic**



"Traffic Volumes", Michigan Department of Transportation, <https://lrs.state.mi.us/portal/apps/webappviewer/index.html?id=1a8bf6b2681d483ca9090ebec5d105ff>



to the Civic Hall, GM Technical Center, and proposed development plans to build commercial, entertainment, and denser residential uses.

A common development pattern is for a community to grow along a major state thoroughfare, which then functions as its Main Street. In this case, the right-of-way serves somewhat competing purposes to two distinct entities: the city and state. This ownership model poses some challenges for cities whose major thoroughfares that carry thousands of vehicles per day are visitors' first impression of the city, and yet it has little say in its design or condition. For instance, if Warren wanted to perform a north or south road diet on Van Dyke Avenue in order to shape the public realm into a welcoming site for pedestrian-oriented commercial and recreational activity, the project would ultimately proceed at the discretion of the Michigan Department of Transportation (MDOT). While this agency does espouse a commitment to Context-Sensitive Design, its decisions have long been directed by values of efficiency. It is not unprecedented for government to collaborate and modify a road's capacity and use to benefit a local community, but it does require an additional layer of review before implementation can begin.

**Users:** public transit, pedestrian, bicycle, truck

**Recommended elements:** crosswalks, pedestrian signals, wayfinding, transit stops, bicycle parking, on-street parking, benches, decorative sidewalks, lighting, buffers

Like most of Warren's corridors, Van Dyke is designed and built for automobile traffic. MDOT estimates the number of vehicles that travel daily by road throughout the year, using the Average Annual Daily Traffic (AADT) metric. Figure 1-8 indicates an average of 18,291 vehicles traveled along the Van Dyke Corridor on a daily basis. Pre-pandemic data from 2019 indicated an AADT of 22,892.<sup>1</sup>

## Public Transportation

Warren is a part of the Suburban Mobility Authority for Regional Transportation (SMART), which provides fixed-route bus service to the southeast Michigan region. SMART route 510 travels along the Van Dyke Corridor, connecting Warren, Center Line, Sterling Heights, Utica, and Shelby Township. Because the bus route terminates at Eight Mile, traveling south into the City of Detroit requires transferring to another bus line.<sup>2</sup> Crosstown 710 travels along Nine Mile Road connecting Warren as far east as St. Clair Shores to as far west as Southfield. DDOT Bus line Bus #17, Eight Mile Road stops at Eighth Mile and Van Dyke Avenue.

## Non-motorized Transportation

Non-motorized transportation is an integral element of transportation systems which advance the ethos of shared roadways and multi-modal commuting. Shifting focus on non-motorized transportation needs and infrastructure is fundamental to transition the Van Dyke Avenue from an auto-oriented thoroughfare into a pedestrian-friendly and multi-modal corridor in Warren.

### Non-motorized Travel Need Assessment

The transformation of this road from a vehicle-centered thoroughfare to a comfortable non-motorized route is likely to significantly impact the character of the whole corridor. Most importantly, it will better serve

the residents of the neighborhoods adjacent to the corridor. According to the American Community Survey (2019), the residents of the Census tracts, including and immediately surrounding the study area, have several characteristics that would benefit from better non-motorized accommodations, as noted in the table titled "Mode of Commute to Work."<sup>3</sup> The first is lack of access to a car: a significantly higher percentage of households in these neighborhoods do not have a car, even when compared with the rest of Warren. This includes people who need to get to work. A smaller share of Van Dyke Corridor neighborhood residents drive alone to work than in Warren, Michigan, and nationally, which includes major metropolitan areas with substantial public transportation assets. In fact, Van Dyke residents take public transportation more than in the city or the state: 4% of workers as opposed to 1-2%. Warrenites are also carpooling, walking, and getting to work by "other means," including bicycling, at higher rates than in the city or state.

A second characteristic that demonstrates the utility of non-motorized assets is the presence of households with children in the Van Dyke neighborhoods, which is seven to nine percentage points higher than elsewhere in the city, state, or nation.<sup>4</sup> Each of these households has more people than drivers, and parents will tell you that this does not mean the non-drivers have fewer destinations. The ability for minors to have age-appropriate control over their own transportation

**Table 1-1: Mode of Commute to Work**

	Van Dyke Corridor Census Tracts*	City of Warren	Michigan	United States
No vehicle available in household	13%	8%	8%	9%
Households with one or more people under 18 years	38%	29%	29%	31%
Car, truck, or van -- drove alone	75%	86%	82%	76%
Car, truck, or van -- carpooled	12%	9%	9%	9%
Public transportation (excluding taxicab)	4%	1%	1%	5%
Walked	2%	1%	2%	3%
Other means	4%	1%	1%	2%
Worked from home	3%	2%	4%	5%
* Note: Includes census tracts 2632, 2638, 2639, 2640 Sources: United States Census Bureau, Tables DP02, DP03, B0823, American Community Survey 5-Year Estimates, 2019.				

United States Census Bureau, DP03 Selected Economic Characteristics in the United States, American Community Survey 5-Year Estimates, 2019. United States Census Bureau, DP03 Selected Social Characteristics in the United States, American Community Survey 5-Year Estimates, 2019.



needs contributes greatly to livability for households in the family-formation phase.

Southeast Michigan Council of Governments (SEMCOG) conducts an Equity and Demand Analysis that combines concentrations of “equity populations” (socioeconomic factors that may impact mobility).

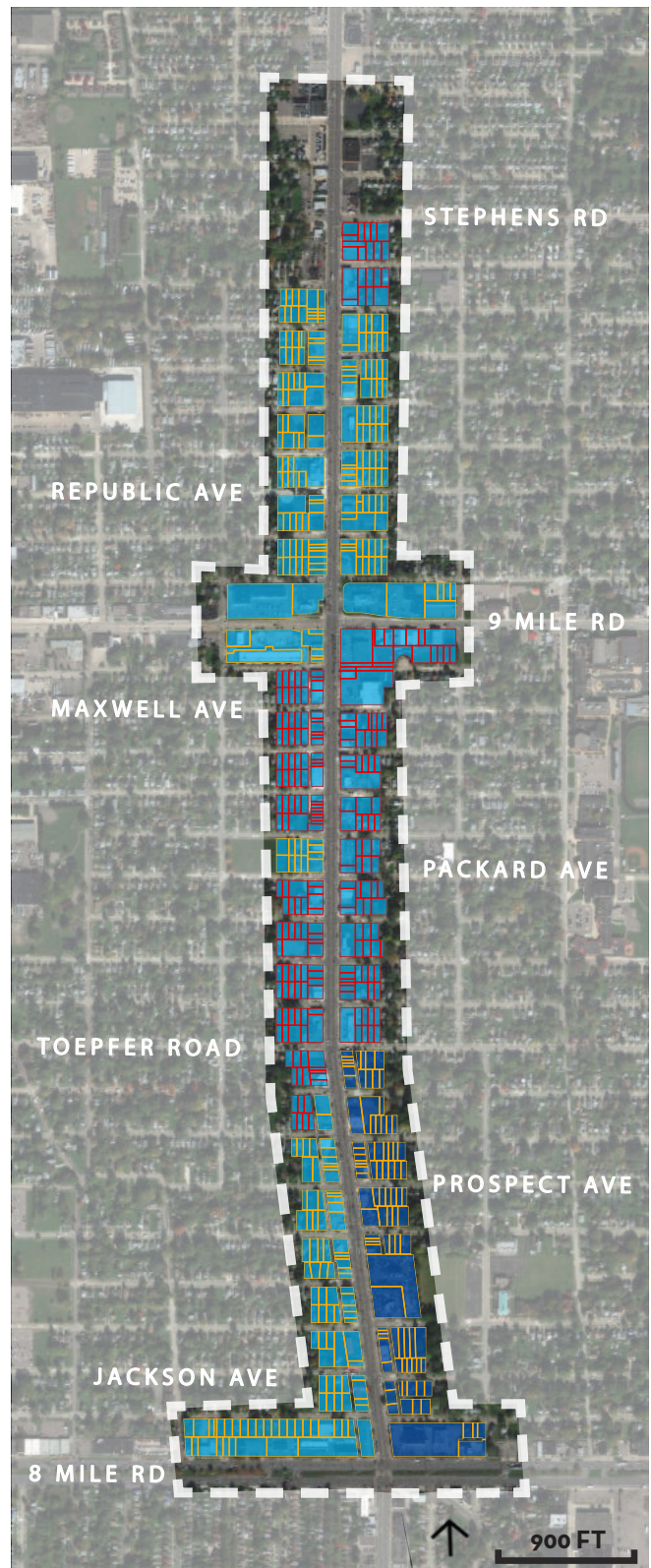
- » High Demand Areas are likely to be the most bicycle and pedestrian friendly parts of the region, or those with the most potential to support more people walking and biking. They include larger downtown commercial districts, employment centers, and densely populated areas. With higher demand, there is also typically greater competition for space within the right-of-way. In these places, planning, programming, and policies that support walking and biking should be a central part of any transportation project.
- » Moderate Demand Areas include many of the region’s smaller town centers, as well as areas adjacent to high demand areas. They are primarily residential areas, with commercial development along major roadways and intersections. These places are likely to support walking and biking, but in many cases driving is still necessary for daily trips. They often include transit services along major roads and grid-patterned residential streets that provide many options for comfortable walking or biking routes.

The findings show that the entire study area has at least a “high” concentration of equity populations and “moderate” demand. There is “high” demand along the middle stretch of the corridor and “very high” concentrations of equity populations in the neighborhoods east of the southern portion of Van Dyke.

### Non-motorized Travel Safety

The Warren Master Plan looks at non-motorized travel in some detail, concluding that the numbers suggest those who take to the streets on foot or bike are risking their lives. It cites a report by Smart Growth America called “Dangerous by Design” which ranked the Detroit-Warren-Dearborn metro area 17th on a Pedestrian Danger Index (PDI) out the top 104 largest metro areas in the U.S. in 2016.<sup>5</sup> The PDI is calculated as a ratio between the number of local commuters who walk to work and the number of pedestrian deaths. The report found that people of color and

Figure 1-9: SEMCOG Equity and Demand Analysis Map



### LEGEND

DEMAND AREAS	CONCENTRATION OF EQUITY POPULATION
<span style="border: 1px solid red; display: inline-block; width: 15px; height: 10px;"></span> HIGH DEMAND	<span style="background-color: darkblue; display: inline-block; width: 15px; height: 10px;"></span> VERY HIGH
<span style="border: 1px solid orange; display: inline-block; width: 15px; height: 10px;"></span> MODERATE DEMAND	<span style="background-color: lightblue; display: inline-block; width: 15px; height: 10px;"></span> HIGH

**Table 1-2: Pedestrian/Vehicle and Bicycle/Vehicle Crashes by Corridor (2016-2021)**

Corridor	Pedestrian Crashes	Bicycle Crashes	Total Crashes
Van Dyke (south of Center Line)	24	20	44
12 Mile	20	19	39
Van Dyke (north of I-696)	24	13	37
Nine Mile	16	14	30
Eight Mile	19	11	30
Schoerherr	14	15	29
Ryan	8	17	25
Mile	12	12	24
Dequindre	13	9	22
Hoover	14	7	21
Martin	9	6	15
14 Mile	11	1	12
Other	4	4	8
<b>Total</b>	<b>188</b>	<b>148</b>	<b>336</b>

Source: Michigan Crash Facts

adults aged 65 and older are overrepresented as victims of collisions. The PDI also tends to increase when income drops, and the rates of uninsured individuals rise. And unfortunately, pedestrian deaths are on an upward trajectory, ironically, as health providers encourage people to walk more for exercise. As the name of the report suggests, pedestrians are unsafe because the roads are not designed to include them, and they have limited other options for commuting.

This is specifically true in the study area. Between 2016 and 2021, there were 24 pedestrian-automobile and 20 bicycle-automobile accidents along the Van Dyke Corridor. As shown in the table titled “Pedestrian and Bicycle Crashes by Corridor (2016 – 2021)”, the Van Dyke Corridor has the highest number of crashes of any corridor in Warren. The crashes along the corridor are the outcomes of a flawed road design scheme that emphasizes automobile efficiency and movement over non-motorized accessibility and safety.

As evident in the map titled “Pedestrian and Bicycle Crashes Map,” there is no major concentration of crashes throughout the corridor, indicating the challenges pedestrians and cyclists face while traveling along Van Dyke are ever-present with no safe refuge. Conflicts between pedestrians and

bicyclists are common at intersections. This signals that facilities for non-motorized travelers are insufficient, even when they are in use. According to the crash data, the most frequent sites of pedestrian crashes are at the intersections of Van Dyke-Eight Mile, Van Dyke-Essex, and Van Dyke-Timken, while the most frequent bicycle crashes happen at Van Dyke-Nine Mile and Van Dyke-Stephens. No bicycle fatalities were reported during this period, but four pedestrians lost their lives in accidents in the vicinity of the intersections at Chapp, Cadillac, Chalmers, and Westminster.

SEMCOG acknowledges that while most roads legally accept non-motorized users, only the hardest bicyclists will actually use a road that does not have specific physical accommodations to support it. SEMCOG assesses “bicycling comfort levels” based on the stress tolerance of users, which are connected to examples of the types of infrastructure that contribute to this comfort level (refer to figure 1-10). Van Dyke Avenue in the southern two-thirds of the study area is considered “comfortable for some people,” meaning that at least some infrastructure exists. Unfortunately, the remainder of the corridor as well as the regional connector of Nine Mile Road all receive the worst rating: “comfortable for few people.” This map suggests that achieving greater use of these routes will

Figure 1-10: Pedestrian and Bicycle/Vehicle Crash Map



**LEGEND**

- NO INJURY
- POSSIBLE INJURY
- MINOR INJURY
- MAJOR INJURY
- FATAL
- PEDESTRIAN CRASH
- BICYCLE CRASH



Figure 1-11: Bicycling Comfort Levels



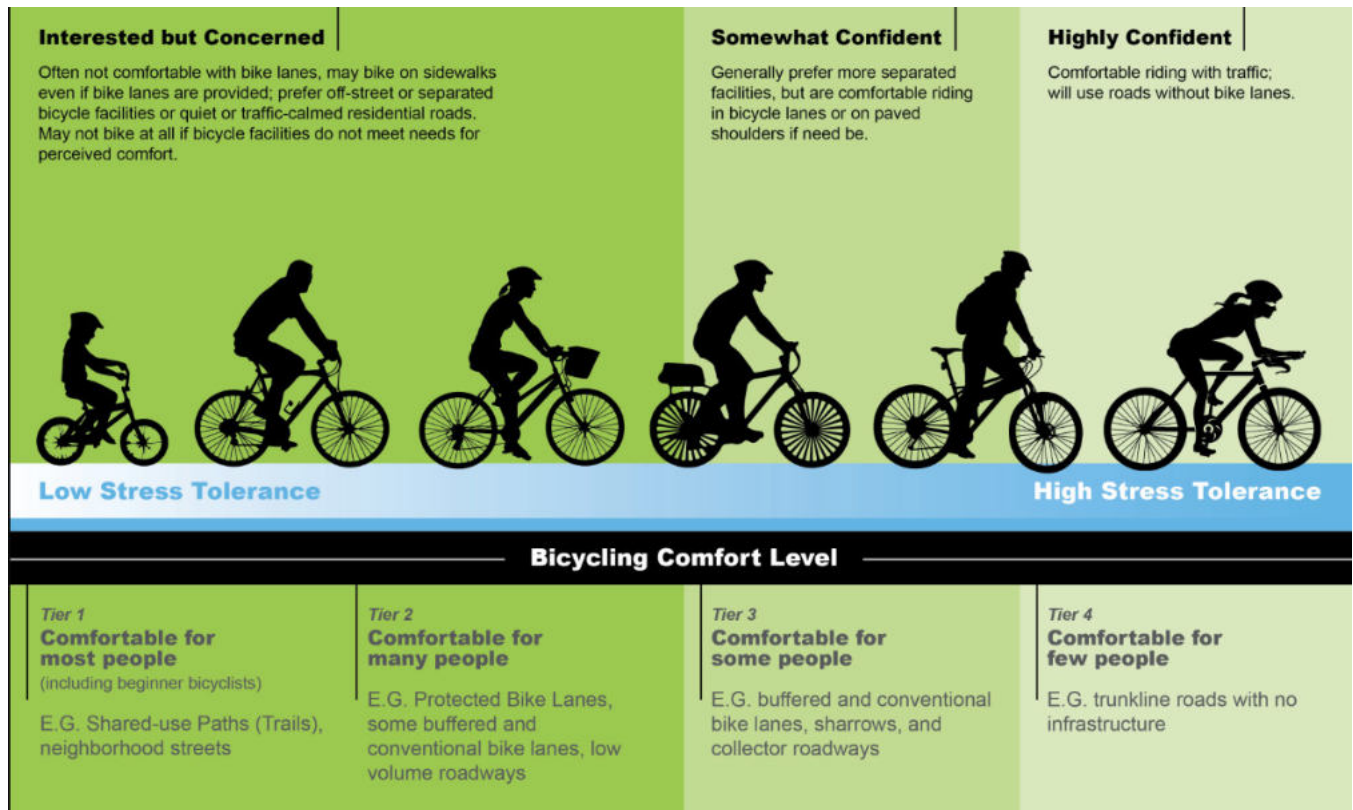
**LEGEND**

- GOOD
- FAIR
- POOR



Figure 1-12 Bicycling Comfort Levels

same title at figure 1-11



Source: Bicycle and Pedestrian Mobility Network, SEMCOG

require installing bicycling infrastructure where none exists and improving the infrastructure that does exist to buffer and protect the non-motorized user.

## Non-motorized Travel Improvements Opportunities

A second dramatic consideration in the changing character of this road is the welcoming of the Iron Belle Trail and its users into the City of Warren. The bicycle route of the state’s flagship trail, described in the box titled “Iron Belle Trail,” traverses the length of the study area. This influx of statewide non-motorized

Coordinated and planned primarily by the Michigan Department of Natural Resources (MDNR), it is one of the longest state-designated trails in the nation. It is a momentous statewide effort that Warren is proud of, not only as a recreational boost for its residents but also the possible attraction of neighboring communities or tourists to the city.

The trail is a patchwork of existing bicycle paths and lanes, sidewalks, and trails, and efforts are in place to connect the gaps. An existing hiking trail runs through Detroit, with several sections still proposed, to become an existing biking path as it heads northwest, deeper into the metro Detroit area. It crosses into Warren on Van Dyke Avenue, heading north and ending at the Warren-Center Line border, and does not pick up again until Sterling Heights. The proposed bicycle connection will meander north along Lawrence Street in Center Line, then zig-zag through Warren along Arsenal Road, Martin Road, Lorraine Boulevard, Common Road, and the ITC Corridor, leaving the city and entering

### Iron Belle Trail

Michigan’s Iron Belle Trail is a pair of trails that extends more than 2,000 miles, across 48 counties, from the western tip of the Upper Peninsula to Belle Isle in Detroit. The portion of the trail that runs along the eastern part of the state, through Warren, is a biking trail, and the west branch of the trail is dedicated to hiking. The two trails join at the top of the lower peninsula.

Sterling Heights. Once the missing sections are completed, it could link Warren to state forests and to the North Country National Scenic Trail that starts in New York and ends in North Dakota.

travelers is an asset to Warren and can increase the economic potential of the corridor, but it will only happen if users feel safe and have an enjoyable experience on the trail.

The study area is also important to regional non-motorized transportation networks. Nine Mile Road is identified by SEMCOG as a regional bicycle and pedestrian corridor linking the Village of Pinkney in Livingston County to the Lake Huron coast at St. Clair Shores. The Macomb County Non-motorized Transportation plan shows this stretch as an east-west connector in the county, and is targeted in its gap analysis. The plan notes that the route includes local schools, two downtowns, and a public boat launch, which would all become accessible to residents of the study area upon completing this connection.<sup>6</sup>

## HISTORIC RESOURCE FIELD SURVEY AND SUMMARY

Historic resources, defined as “a publicly or privately owned building, structure, site, object, feature, or open space that is significant in the history, architecture, archeology, engineering, or culture of a community,” are integral to the City of Warren’s built environment. While Warren has a designated Village Historic District, historic resources are visible throughout the City, especially along one of the oldest parts of the City, the Van Dyke Corridor. With the aim of identifying and preserving valuable community assets, this plan incorporated a field survey to inventory historic resources along the Van Dyke Corridor.

Preservation Forward was contracted by Beckett and Raeder Inc. in July 2021 to carry out a historic resource field survey and summary of properties along the Van Dyke Corridor. The project boundary encompasses Van Dyke Avenue’s combination of commercial, residential, and light manufacturing building types in a suburban setting. Additional supporting documents may be found in the Appendix.

## Methodology

### *Pre-Field Research*

Prior to the historic resource field survey, a records check was conducted at the State Historic Preservation Office (SHPO) for information on the Van Dyke Corridor. The records check included a review of any extant, relevant cultural resource management reports, archaeological investigations, National Register of Historic Places (NRHP) nominations, and other research reports. Online research, including published histories, oral interviews, and other related information on the Van Dyke Corridor was reviewed to supplement the historic resource field survey.

### *Field Assessment Methodology*

Methodology for evaluating historic resources is based on the NRHP Criteria for Evaluation, which is guided and administered by the National Park Service under the direction of the Secretary of the Interior. Authorized by the National Historic Preservation Act of 1966, the NRHP is part of a program to coordinate and support public and private efforts to identify, evaluate, and protect America’s historic and archaeological resources. The National Register documents the appearance and importance of districts, sites, buildings, structures, and objects that are significant in American history and prehistory. It is the nation’s inventory of historic places and its repository of documentation on the variety of historic property types, significance, condition, ownership, needs, and other information. The Criteria for Evaluation define the scope of the NRHP; they identify the range of resources and significance that qualify properties for listing in the National Register. The National Register Criteria are written broadly to recognize the wide variety of historic properties associated with our prehistory and history.<sup>7</sup>

Historic buildings and neighborhoods often evoke passionate feelings. The threat of demolition can spark heated community debates about whether a building is historic or not. As these discussions take place, some community members may conclude that others think “everything is historic” and must be “saved.” In fact, preservation professionals and historic district commissions make determinations about what is or is not historic based on the NRHP criteria which have been tested, used, and periodically revised since their initial development in 1966.

## The National Register of Historic Places

The National Register of Historic Places (NRHP) is the official list of the nation's historic places worthy of preservation. It is the official list of properties significant in the history, architecture, archaeology, and culture of the United States. These are buildings, districts, sites, objects, and structures that possess "integrity of location, design, setting, materials, workmanship, feeling, and association," and that:

- » A: Are associated with historic events;
- » B: Are associated with "the lives of persons significant in our past;"
- » C: Embody distinctive architectural or artistic characteristics;
- » D: Have yielded or are likely to yield information important in history or prehistory.

The National Register Bulletin titled "How to Apply the National Register Criteria for Evaluation" is a helpful guide for the evaluation of historic properties. This guide was used in the site assessment.

The National Register Criteria for Evaluation evaluates historic properties by age, significance, and integrity. The rule of thumb is that a property must be fifty years of age or older. The property must also look like it did when it was originally constructed, though it's understood that properties change and evolve over time. Significance can fall within four categories. A property may be associated with an event, an activity, or developments in the past. A property may relate to people who were important in the past. A property may convey architectural history or craftsmanship or may be associated with landscape history or other engineering achievements. And finally, a property may have the potential to yield information through archaeological investigation about our past.

The site assessment included walking the boundaries of the district. Historic resources were identified, evaluated for architectural and historical significance, and analyzed for historic integrity. The site assessment is the framework for evaluation for National Register eligibility.

Historic resources must retain integrity. Integrity is the ability of a property to convey its significance: historic and architectural. To be listed in the NRHP, a property must not only be shown to be significant under the National Register criteria, but it also must have integrity. The evaluation of integrity is sometimes a subjective judgment, but it must always be grounded in an understanding of a property's physical features and how they relate to its significance.

According to the National Register Criteria for Evaluation, "historic properties either retain integrity (that is, convey their significance) or they do not." Within the concept of integrity, the National Register criteria recognizes seven aspects or qualities that, in various combinations, define integrity. To retain historic integrity, a property will always possess several, and usually most, of the aspects. The retention of specific aspects of integrity is paramount for a property to convey its significance. Determining which of these aspects are most important to a particular property requires knowing why, where, and when the property is significant.

Historic resource field surveys and their resulting summaries form an important basis for planning decisions and future historic preservation efforts. In order to plan for the preservation and protection of the historic, built environment, the first step is to assess the existing properties along the Van Dyke Corridor. This field assessment and summary are a reconnaissance-level survey of the Van Dyke Corridor. A reconnaissance-level survey is a preliminary step that identifies if properties are worthy of further study. Because reconnaissance-level surveys do not typically include research on the histories of the surveyed resources, the survey is broad and does not provide

### Historic integrity is defined through seven aspects:

- » Location
- » Design
- » Setting
- » Materials
- » Workmanship
- » Feeling
- » Association




evaluations of historic significance. For evaluations of historic significance, an intensive-level survey is a natural next step that includes historical research on the surveyed properties and provides information needed for determining which individual properties and areas are eligible for historic designations and for defining the boundaries of any historic districts. This level of field survey and summary of properties along the Van Dyke Corridor helps to proactively plan for the future of the Van Dyke Corridor while considering the past.





### Field Assessment Findings

A reconnaissance evaluation of 123 properties within the Van Dyke Corridor from Eight Mile Road to Stephens Avenue was conducted. Of these 123



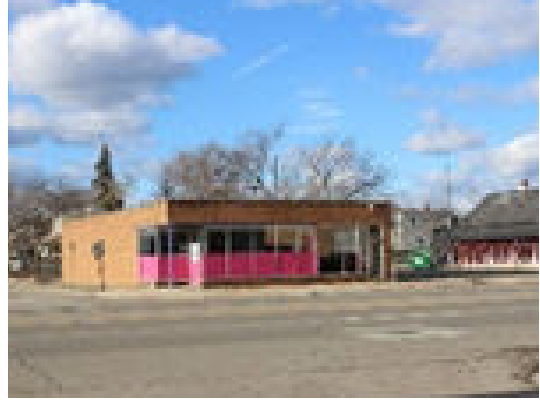

properties, 100 are recommended as “not historic.” Most of these properties are recommended “not historic” because they are under 50 years of age or have lost historic integrity. Preservation Forward recommends that the remaining 23 properties require additional research to determine eligibility for listing in the National Register of Historic Places. These 23 properties are not contiguous, and some do show signs of slightly altered historic integrity. However, the properties also illustrate an architectural period within the Van Dyke Corridor that begs for more intensive-level survey and evaluation. The tables below identify the 23 properties, and a detailed description of each property may be found in Appendix A.





**Table 1-3: Surveyed Properties Within the Van Dyke Corridor, At Least 50 years of Age and Embody Historic Integrity**


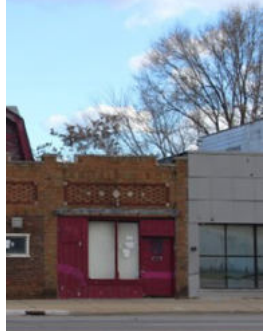



Map Key	Name	Address	Date of Construction	Style	Image
1	Kim's Elevation School of Cosmetology	20958 Van Dyke Avenue	1953	20th Century Commercial	
2	Base Line Feed Store	21015 Van Dyke Avenue	1877, 1940	19th Century Commercial with 20th Century Commercial Addition	
3	N/A	21227 Van Dyke Avenue	1950	20th Century Commercial	

Map Key	Name	Address	Date of Construction	Style	Image
4	N/A	21234 Van Dyke Avenue	1963	20th Century Commercial	
5	Nono's Pizza	21351 Van Dyke Avenue	1950	Two-story, 20th Century Commercial	
6	All Star Books	21747 Van Dyke Avenue	1950	20th Century Commercial	
7	Vacant	21805 Van Dyke Avenue	1950	Two-story, 20th Century Commercial	



Map Key	Name	Address	Date of Construction	Style	Image
8	Maybelle Burnette Library	22005 Van Dyke Avenue	1966	20th Century, Municipal Building with mid-century modern stylistic elements	
9	Gingle's Barber Shop	22555 Van Dyke Avenue	1969	20th Century Commercial	
10	Nik Necessities Shop	22715 Van Dyke Avenue	1956	20th Century Commercial	
11	Carl's Safety Service	22720 Van Dyke Avenue	1950	20th Century Commercial	

Map Key	Name	Address	Date of Construction	Style	Image
12	MI Maintenance Supply	22740-22760 Van Dyke Avenue	1940	20th Century Commercial	 A wide-angle photograph of a two-story commercial building with a mix of brick and light-colored siding. The building has a flat roof and large windows on the ground floor. The sky is blue with scattered white clouds.
13	A-1 Family Barbers	22860 Van Dyke Avenue	1950	20th Century Commercial	 A close-up photograph of a single-story commercial building with a brick facade and large glass windows. A yellow sign with black lettering is visible above the entrance. The building has a low-pitched roof.
14	Appliances Outlet	22865 Van Dyke Avenue	1950	20th Century Commercial	 A wide-angle photograph of a single-story commercial building with a brick facade and large glass windows. The building is situated on a street corner. The sky is overcast with grey clouds.
15	Ed & Lil's Flower Shop	22866 Van Dyke Avenue	1950	20th Century Commercial	 A close-up photograph of a single-story commercial building with a brick facade and large glass windows. A yellow sign with black lettering is visible above the entrance. The building has a low-pitched roof.

Map Key	Name	Address	Date of Construction	Style	Image
16	N/A	23150 Van Dyke Avenue	1950	20th Century Commercial	
17	N/A	23154 Van Dyke Avenue	1950	20th Century Commercial	
18	N/A	23158 Van Dyke Avenue	1950	20th century residential, Dutch Colonial style home with 20th century commercial addition at façade	
19	Pro Shop Hobbies	23326 Van Dyke Avenue	1950	20th Century Commercial	
20	Stan's Exhaust and Tune Up	23537 Van Dyke Avenue	1950	20th Century Commercial	

**Table 1-13: Historic Inventory**



The following five properties require intensive-level survey and additional research prior to making an evaluation of NRHP eligibility determination.

Of the 23 properties that were surveyed, the properties identified in Table 1-4 embody characteristics of excellent redevelopment opportunities and may serve as a catalyst for future reinvestment within the Van Dyke Corridor.



23158 Van Dyke Avenue was identified as a historic building



21747 Van Dyke Avenue, the former All Star Books building, was identified as a historic building

**Table 1-4: Properties Identified for Future Intensive-Level Survey and Additional Research Recommendations**

Address	Name	Recommendation	Criteria for Evaluation*	Potentially Individually-eligible or Contributing to a District
21015 Van Dyke Avenue	Base Line Feed Store	Potentially eligible	A, C	Individually
22005 Van Dyke Avenue	Maybelle Burnette Library	Potentially eligible	A, C	Individually
22720 Van Dyke Avenue	Carl's Safety Service	Potentially eligible	C	Individually
22740 Van Dyke Avenue	MI Maintenance Supply	Potentially eligible	C	District
22760 Van Dyke Avenue	MI Maintenance Supply	Potentially eligible	C	District

\*Please refer to Field Assessment Methodology for reference to the National Register Criteria for Evaluation.

**Table 1-5: Properties that Serve as Great Redevelopment Opportunities**

Address	Name	Vacant or Occupied	Recommendation
21015 Van Dyke Avenue	Base Line Feed Store	Vacant	This is a locally-designated, historic landmark awaiting to be redeveloped sympathetically with its rich history and connection to the Van Dyke Corridor.
21227 Van Dyke Avenue	Unknown	Vacant	This 20th century, one-story commercial building with an adjacent parking lot is ripe for redevelopment.
21234 Van Dyke Avenue	Unknown	Undetermined	This 20th century, one-story commercial building with an adjacent parking lot is ripe for redevelopment.
21351 Van Dyke Avenue	Nono's Pizza	1st floor/street level commercial space is occupied. Undetermined on the upper floor.	This 20th century, two-story, mixed-use building with an adjacent parking lot would be a perfect pilot project for upper-story residential units along the Van Dyke Corridor.
21805 Van Dyke Avenue	Vacant	Undetermined on both the 1st floor/ street level commercial space and upper floor.	This 20th century, two-story, mixed-use building with a rear parking lot would be a perfect pilot project for upper-story residential units along the Van Dyke Corridor.
22715 Van Dyke Avenue	Nik Necessities Shop	Undetermined if fully occupied	This 20th century, one-story commercial building with an adjacent parking lot is ripe for redevelopment.

Address	Name	Vacant or Occupied	Recommendation
23150 Van Dyke Avenue	Vacant	Undetermined, appears to be vacant	This 20th century, one-story commercial building with an adjacent parking lot is ripe for redevelopment. 23150, 23154, and 23158 Van Dyke Avenue are contiguous and all appear to be vacant and underutilized properties. The right buyer would buy all three of these properties to rehabilitate as a substantial redevelopment deal. This reinvestment would transform the built environment along this block of Van Dyke Avenue.
23154 Van Dyke Avenue	Vacant	Undetermined, appears to be vacant	This 20th century, one-story commercial building with an adjacent parking lot is ripe for redevelopment. 23150, 23154, and 23158 Van Dyke Avenue are contiguous and all appear to be vacant and underutilized properties. The right buyer would buy all three of these properties to rehabilitate as a substantial redevelopment deal. This reinvestment would transform the built environment along this block of Van Dyke Avenue.
23158 Van Dyke Avenue	Vacant	Undetermined, appears to be vacant	This 20th century, one-story commercial building with an adjacent parking lot is ripe for redevelopment. 23150, 23154, and 23158 Van Dyke Avenue are contiguous and all appear to be vacant and underutilized properties. The right buyer would buy all three of these properties to rehabilitate as a substantial redevelopment deal. This reinvestment would transform the built environment along this block of Van Dyke Avenue.

## LAND USE SURVEY AND SUMMARY

### Land Use by Tax Classification

Local property assessors assign property tax classifications to each parcel in Warren to determine bi-annual property tax rates. These land use codes are one tool to illustrate the existing land use framework of the Van Dyke Corridor. The boundaries for the existing land use analysis follow the jurisdictional boundaries of the Tax Increment Financing Authority (TIFA).

The corridor is predominantly a mix of commercial and residential properties. Of the 603 parcels, 52% are residential, 32% are commercial, 15% are exempt,

and 1% are industrial. However, parcels range in size, so it is also important to look at land use from a total area perspective. When considering the corridor in terms of acreage, 48% of the corridor is commercial, 37% is residential, 13% is exempt, and 2% is industrial. The commercial properties are the most visible because of their frontage along Van Dyke, while most of the residential properties are located behind the commercial buildings and are accessible from side streets. Additionally, 11% of the land in the corridor is considered vacant, meaning a lot without a structure on it, and the majority of the vacant parcels are commercial.

**Table 1-6: Van Dyke Existing Land Use**

Land Use	Total		Percent of Total	
	Parcels	Acres	Parcels	Acres
<b>Commercial</b>	<b>194</b>	<b>47.2</b>	<b>32.2%</b>	<b>48.2%</b>
Improved	138	40.7	22.9%	41.6%
Vacant	56	6.5	9.3%	6.6%
<b>Residential</b>	<b>311</b>	<b>36.0</b>	<b>51.6%</b>	<b>36.8%</b>
Improved	283	32.8	46.9%	33.6%
Vacant	28	3.1	4.6%	3.2%
<b>Exempt</b>	<b>92</b>	<b>13.0</b>	<b>15.3%</b>	<b>13.3%</b>
Local	83	9.9	13.8%	10.1%
Schools	2	2.0	0.3%	2.0%
Other	7	1.1	1.2%	1.1%
<b>Industrial</b>	<b>6</b>	<b>1.7</b>	<b>1.0%</b>	<b>1.8%</b>
Improved	2	0.6	0.3%	0.6%
Vacant	3	1.1	0.5%	1.1%
Utilities	1	0.1	0.2%	0.1%

Source: City of Warren

### Detailed Land Use Inventory

Another inventory of the existing land uses was taken using Google Street View, with uses classified according to the North American Industrial Classification System. The purpose of this analysis is to note clusters of establishment types, which can offer opportunities to build on development synergies. Once the detailed uses were identified, they were grouped into three categories based on whether the use contributes to a walkable character, detracts from a walkable character, or is neutral regarding walkability.

An early finding demonstrates how these two characteristics may intersect in ways that require careful planning: the largest concentration of business types in the corridor (30 business of 114 that were identified, or 25%) are auto-oriented, including car

dealerships, vehicle repair establishments, and gas stations. On the one hand, this suggests a business cluster, and a traditional recommendation would be to build upon their presence by looking for opportunities to recruit related businesses in order to increase the competitive advantage of that sector in the community. Indeed, the market analysis in the next section finds that these are “surplus” sectors, meaning that they are bringing in customers from outside the immediate area. However, the presence of other vacant buildings and parcels in the area suggests that there is no pent-up demand for expansion, and this sector may already be maxed out in the area. The specifically auto-centric design of these establishments, which are often large parcels with heavily used access points, also represents an opportunity cost. They detract from the overall walkability of the area, which has been shown in previous sections to be important to the corridor.

The corridor already hosts a substantial and diverse assortment of use types that naturally lend themselves to a walkable environment, are considered amenities to residents who live nearby, and can serve as draws for users of the Iron Belle Trail and other non-motorized routes. Retail uses (15), food service (9), and entertainment/recreation establishments (5) make up another 25% of the businesses on the corridor. These uses should be supported and celebrated as assets, though it should be noted that just because they are desirable destinations does not mean they necessarily present a comfortable non-motorized environment. Many were built under codes that prioritized car movement, and their popularity means that their access points may be as busy as any, increasing chances for collisions between cars, bicycles, and pedestrians. But a baseline requirement of walkability is simply whether there is anywhere to walk to, and it is often easier to retrofit the site of a successful business with some non-motorized infrastructure than it is to entice a new use.

The remaining businesses in the corridor are generally of a service nature: professional services like finance and real estate (15), personal services like hair and nail care (11), and “eds and meds” (7). Also included in this category are four sites which have multiple businesses in a strip mall format. These are also considered amenities to nearby residents and are often “good neighbors” to residential uses because they fit on small parcels and have limited traffic. They are less of a draw to trail users, but their light-duty access points quietly benefit the trail environment.

When reviewing land use on the corridor through the lens of walkability, two patterns emerge most prominently. The first is that the area surrounding the node at Van Dyke and Nine Mile roads is already well-populated by retail and restaurant uses, some of which are destinations that can serve locals and trail users alike. This planned nexus of state- and county-wide trails also has sidewalks and bicycle lanes on Van Dyke and sidewalks on Nine Mile. The corner has a suburban character with buildings separated from the road by parking and drive-throughs attached to both restaurant and retail uses, but buildings come back up to the sidewalk immediately past the intersection to both the north and the south.

The second pattern is the concentration of auto-oriented uses in the southern portion of the corridor. However, in an interesting juxtaposition, the design of the corridor works to offset the impact of these uses

**Figure 1-14: Walkable Land Uses**



**LEGEND**

- HIGHLY CONTRIBUTE
- MODERATELY CONTRIBUTE
- SLIGHTLY CONTRIBUTE
- DO NOT CONTRIBUTE



somewhat: buildings are generally adjacent to the sidewalk, or the parcel has an edge treatment such as a low wall to create a relationship to the sidewalk, and both sidewalks and a bike lane are in place. To the extent that these businesses are valuable in the city and are functioning successfully, these “bones” point the way to integrating seemingly competing interests. Unfortunately, this section also demonstrates some signs of vacancy and deterioration in addition to several grassed empty lots, which can dampen its appeal for the non-motorized traveler. It’s possible that what isn’t present in the corridor is a bigger drag on the walkability than what is. Still, the established development pattern of zero lot lines is there to mimic for those willing to invest in this portion of Van Dyke.

### Vacancy and Condition

The detailed land use inventory counted 26 buildings which appeared to be vacant, and 31 lots with no structures on them. These represent the best opportunities to nudge the corridor in the direction of Warrenites’ vision. In several areas, entire block faces are devoid of operating establishments. These include the east side of Jackson to Rivard; the west side of Orchard to Meadow; and both sides of Studebaker to Chalmers. In addition, three of the four corners at Continental Avenue lack a functioning business.

As noted in the Historic Resources section, a few vacant buildings contribute to the historical significance of the area. It is important to note these preservation opportunities alongside the development flexibility, because although it is tempting—and often less expensive in the short term—to tear down an aging building when a new proposal is on offer, preserving the resource pays dividends over time in terms of character and visual interest. Viable strategies and recommendations to intersect historic preservation and planning initiatives are detailed in the “Land Use Strategy” chapter, and additional historic preservation resources may be found in the Appendix.

Also contributing to the overall condition of the corridor are the neighborhoods behind the buildings that line Van Dyke Avenue. These neighborhoods are visible when traveling along the corridor, so their condition contributes to the visual interest. The sensitive structures analysis from the Master Plan uses building age and assessed value to estimate building condition. The analysis scores each block on a range from one to five, one is the highest condition and five the lowest. Along Van Dyke, eight blocks are classified as a five, 35 are classified as a four, six are classified

Figure 1-15: Vacant Lots



#### LEGEND

- VACANT LAND
- PARKING LOT
- VACANT BUILDING



900 FT

as a three, and four blocks are classified as a two. No blocks along Van Dyke were deemed to meet the highest building condition rating. One contributing factor to the lower scores of the neighborhoods along the corridor is the age of development. Historically, Warren was developed from south to north, so these buildings and neighborhoods along Van Dyke are some of the oldest in the entire city.

## Structure Sensitivity & Total Vulnerability

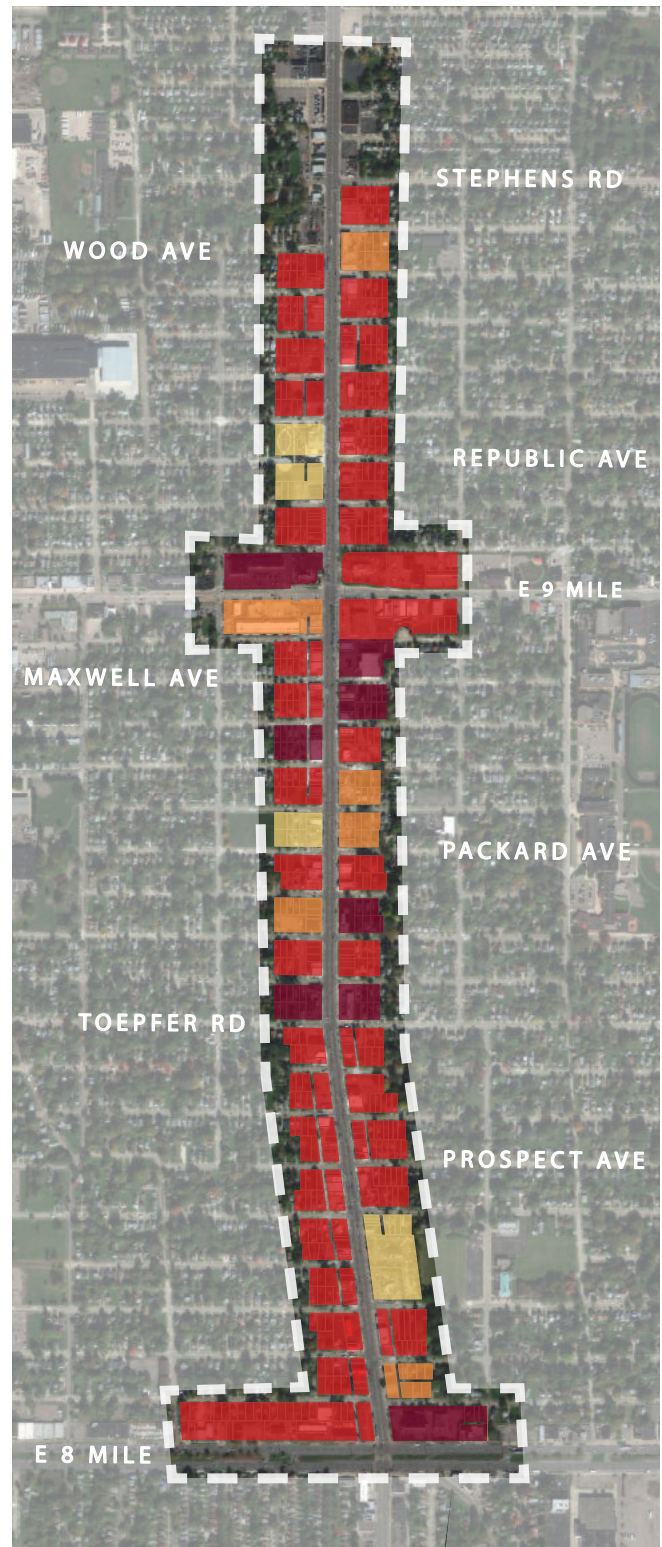
### Total Vulnerability

Once all three measures of exposure and sensitivity were produced, the results were combined to generate one overall vulnerability map. Each of the point totals for sensitive people, lands, and structures were aggregated to highlight the most and least vulnerable parts of the city. The "Total Vulnerability" map illustrates that most of the city is at least somewhat vulnerable with very little exception. The northeast quadrant is the least vulnerable because it has the least number of dark red polygons, but still many blocks fall into the mid- and high-vulnerability ranges. The deepest swaths of dark red are in residential neighborhoods on both sides of Van Dyke between Eight and Nine Mile Roads, and in the southern corners of the city. The map confirms that south Warren is the most vulnerable section of the city, even though it is the furthest from the floodplain. Its structural deficiencies and sensitive populations mean that this area will struggle to respond to and recover from climate shocks. When the community-identified assets are included, more than a dozen of residents' most beloved places are located within the most vulnerable blocks. Not only would those physical structures and the people in them suffer, but the way the remaining residents see and experience the City will change for the worse as well.

### Structures

The built environment is the landscape that we live in, the conduit that enables goods and services we require to survive, and the infrastructure we

Figure 1-16: Sensitive Structures



### LEGEND

- LOWEST SENSITIVITY
- LOW SENSITIVITY
- MEDIUM SENSITIVITY
- HIGHEST SENSITIVITY



900 FT

move through to flee a crisis. The variables used in this analysis are proxies that are highly correlated with the quality of residential, commercial, and industrial structures. Structures with higher assessed values are assumed to be both constructed of higher quality materials, and to have had occupants with greater means for regular maintenance. They therefore tend to be in better shape and consequently are better guardians of people's health and safety. The age of the building gives some indication of the types of materials used: in Michigan, typically structures built prior to 1940 were made of a more porous concrete that allows more water to enter into the structure's foundation. As building standards have improved over the decades, some of which specifically protect buildings from flooding, new homes are generally better suited to withstand nature's curveballs.

### Adopted Master Plan Future Land Use Policy

The Master Plan adopted in 2021 contains a detailed Future Land Use Map that indicates the preferred direction of future development. It forms the legal basis for the Zoning Ordinance, and is consulted when rezonings, special land uses, planned developments, and other discretionary land use decisions are considered. The Future Land Use Map designates the entirety of the study area as a "mixed use node," radiating outward from the intersection of Van Dyke and Nine Mile Roads. This designation is intended to allow for primarily commercial uses on the ground floor alongside moderate-density residential development. This land use combination is symbiotic, both the business owners and residents benefit from their proximity, businesses from a steady stream of patrons, and residents from convenient access to goods and services without a car.

The Master Plan also acknowledges vacancy in this portion of the city and suggests that it may be a good location in to assemble parcels for bold development that meets the desired character of the area. The Action Plan includes the following recommendations:

- » Explicitly permit a range of highly visible uses focused on renewable energy, public art, and access to nature.
- » Concentrate experimental projects in this area to draw attention.

Figure 1-17: Future Land Use



**LEGEND**

- TRADITIONAL RESIDENTIAL
- MIXED USE
- CIVIC & INSTITUTIONAL

↑  900 FT

A connection is made in the plan between the mixed-use development format and the physical design of the corridor, especially when it comes to amenities. The addition of residents into the pool of the most regular users of the street environment means that crosswalks, street trees, and lighting will be experienced by more users around-the-clock. It also means that the environment will need to make at least some people comfortable enough to call it “home,” which is a different set of expectations than one might have when visiting a purely business district. Both the Master Plan and a previous corridor study call out a desire for features to make the corridor more comfortable, connected, and social.

During the Master Plan process, which included extensive public engagement, the study area was a consistent subject of proposed improvement (the area is referred to as “South Warren” in the plan). This report is a direct result of the plan’s community-driven recommendation to invest in this area. In addition to

## Economic Development Opportunities Along Van Dyke Corridor

Physical improvements are a contributor to economic development. The Van Dyke Corridor, between Eight Mile Road and I-696 in the TIF district, could use public investment that would create an enticing approach to the mixed-use development. The investment would be a win-win in that it polishes the public realm, improves the user’s experience, and could motivate private sector investment along the corridor. A 2003 study of the corridor identified pedestrian enhancements such as intersection crossing enhancements, refuge islands, access management, sidewalk improvements, and shared parking arrangements, among others. There was also a call to make the corridor more social, to make the route part of the attraction and not just a means to an end. The elements of sociability mentioned coincide with design principles that make pedestrians feel safer: lighting, fixed sidewalks, graffiti removal, green space, and improved appearance of store facades. A physical transformation could encourage walkability and drive more foot traffic to the retail hub.

Excerpt from the 2021 Master Plan

the specific recommendations for land use and design, the overall sentiment of Warrenites was that this section of the community is the one that has been left furthest behind, and that it deserves timely, thoughtful attention and care.

## South Warren

There is a stark divide between north and south Warren, shown in demographic and economic indicators such as housing value, income, and race. Lower median household incomes are clustered heavily in south Warren with only small pockets of lower incomes above I-696. There is also a higher concentration of minority populations in south Warren. Additionally, south Warren is the most vulnerable section of the city in terms of its ability to respond to and recover from impending climate shocks. These themes of division and segregation came through strongly across all Town Hall meetings. Historically, south Warren has received less investment and has thus had reduced access to services. Over the past few years, however, the city has acted to combat years of disinvestment with new key public developments such as the Busch Branch Library, pocket parks, and the Civic Center South development.

Excerpt from the 2021 Master Plan

## MARKET REVIEW AND SUMMARY

A market analysis examines whether the current businesses of an area are meeting the retail and service needs of a population. For example, are there enough furniture stores in the City of Warren to meet the local demand, or do residents travel elsewhere to buy furniture? When residents have to leave the city to meet their demand for a certain good or service, a retail “leakage” occurs. A leakage represents the money that leaves Warren to be spent in retail options outside of the city. The “leakiest” retailer segments in Warren are clothing /accessory stores; electronics / appliance stores; and sporting goods / hobby / book / music stores, to the estimated tune of \$73,430,273 annually in just those three sectors. The retail gap, or the difference between what is supplied and what residents demand, underscores the potential success certain retailers could have in Warren. In contrast to “leaky” retail, there are “surplus sectors,” which are retail sectors that draw customers

**Table 1-7: Van Dyke Existing Market Potential**

Industry Group	Supply	Demand	Gap	Surplus or Leakage
Clothing and accessories	\$26,941,492	\$71,665,376	\$44,723,884	Leakage
General merchandise	\$185,142,524	\$220,411,015	\$35,268,491	Leakage
Sporting goods, hobby, book, music	\$20,691,302	\$37,780,839	\$17,089,537	Leakage
Electronics and appliances	\$33,298,539	\$44,915,391	\$11,616,852	Leakage
Miscellaneous	\$42,177,816	\$52,882,586	\$10,704,770	Leakage
Non store retailers	\$18,262,702	\$26,596,953	\$8,334,251	Leakage
Health and personal care	\$171,955,401	\$104,942,810	-\$67,012,591	Surplus
Furniture and home furnishings	\$72,353,238	\$46,140,692	-\$26,212,546	Surplus
Gasoline stations	\$265,075,083	\$167,686,856	-\$97,388,227	Surplus
Motor vehicle and parts	\$407,529,290	\$307,288,203	-\$100,241,087	Surplus
Building materials, garden equipment and supply	\$128,321,990	\$100,365,485	-\$27,956,505	Surplus
Food and beverage	\$350,166,434	\$256,735,388	-\$93,431,046	Surplus
Food services and drinking places	\$177,613,595	\$145,938,610	-\$31,674,985	Surplus

Source: ESRI Retail Market Potential

**Table 1-8: Leakage Businesses, 2017**

Industry Group	Supply	Demand	Gap
Other General Merchandise Stores	\$40,466,242	\$70,219,650	\$29,753,408
Clothing Stores	\$19,196,988	\$48,209,928	\$29,012,940
Sporting Goods/Hobby/Musical Instr Stores	\$15,488,090	\$31,680,506	\$16,192,416
Shoe Stores	\$2,270,490	\$10,350,632	\$8,080,142
Electronic Shopping & Mail-Order Houses	\$13,029,157	\$20,779,233	\$7,750,076
Jewelry, Luggage & Leather Goods Stores	\$5,474,014	\$13,104,816	\$7,630,802
Home Furnishings Stores	\$12,187,497	\$17,726,387	\$5,538,890
Department Stores Excluding Leased Depts.	\$144,676,282	\$150,191,365	\$5,515,083
Lawn & Garden Equip & Supply Stores	\$4,467,079	\$9,185,063	\$4,717,984
Other Miscellaneous Store Retailers	\$27,207,818	\$31,174,135	\$3,966,317
Office Supplies, Stationery & Gift Stores	\$6,811,204	\$10,462,831	\$3,651,627
Used Merchandise Stores	\$5,478,664	\$8,752,606	\$3,273,942
Beer, Wine & Liquor Stores	\$16,888,807	\$18,551,878	\$1,663,071
Vending Machine Operators	\$426,429	\$1,510,228	\$1,083,799
Book, Periodical & Music Stores	\$5,203,212	\$6,100,333	\$897,121
Special Food Services	\$3,498,308	\$4,270,754	\$772,446

Source: ESRI Retail Market Potential

from outside of the city. Warren is attracting outside dollars in motor vehicle and parts; furniture / home furnishings; health / personal care; food / beverage; building materials / garden equipment / supply stores; and gas stations.

The best retail sectors to recruit or encourage development in Warren are those that are leaking because there is unmet demand to fulfill. Additionally, identifying leaking retail sectors that also contribute to the desired environment of the Van Dyke Corridor will aid in drafting recommendations to achieve the vision for the corridor. For example, if the desired corridor is walkable and active and there is a leakage of eating/drinking establishments, then zoning regulations along the corridor should be tailored to support restaurants and other similar businesses because they would contribute to an active atmosphere. This could include permitting regulations for outdoor dining areas and/or food truck rallies. The table titled “Leakage Businesses” shows the full range of retail leakage for the City of Warren.

## SEMCOG TRAFFIC ANALYSIS MEETING AND SUMMARY

A coordination meeting was conducted with MDOT, the City of Warren, and Beckett & Raeder in February 2023 to exchange information and manage important elements of the Van Dyke Avenue Corridor project. The purpose of the meeting was to discuss additional analyses required for implementation, to pinpoint tools to support the development and evaluation of the corridor design, and to identify potential funding sources.

The meeting further instilled the need for design interventions that reduce jaywalking along the corridor, as this has posed a significant risk to pedestrian safety. Additionally, some proposed corridor enhancements—like protected bike lanes—were noted to require maintenance funding and specific equipment. Implementation of protected bicycle lanes would optimally be paired with the purchase of downsized street maintenance vehicles. The National Association of City Transportation Officials (NACTO) has conducted a case study on downsized street maintenance vehicles that suggests the initial investment may be leveraged by selecting a vehicle with multiple uses that include compact sweeping and plowing.

Utilization of existing tools to analyze the performance of the corridor design were encouraged in this meeting. The tools included the MDOT and SEMCOG multi-modal tool and Street Mix. Additionally, several potential funding sources for the implementation of the corridor design were identified and are highlighted further in the Implementation portion of this report.

## REGULATORY REVIEW & SUMMARY

At the time of this report, the zoning designation along the length of the Van Dyke Avenue Corridor is C-2, General Business District. This commercial district permits retail, service, office, recreation, assembly, and institutional uses, but explicitly excludes residential. It is distinguished from the C-1 Local Business District by permitting auto-oriented uses such as repair shops, car washes, and drive-in restaurants, sometimes with use-specific site requirements. Pawn shops and sexually-oriented businesses are also permitted in the district, if they meet the zoning criteria, but are excluded from the DDA and TIFA boundaries and thus from the study area.

The City of Warren is updating its Zoning Ordinance concurrently with the development of this Corridor Plan to conform with the Master Plan recommendations. As noted above, the proposed district is a “mixed use node” radiating from the intersection of Van Dyke Avenue and Nine Mile Road. A key feature of this district is the introduction of residential uses. The existing permitted commercial uses are adequate to accommodate the needs of local residents and potential trail users and should be carried forward. Specific existing and desired auto-oriented uses should be permitted after careful review, with updated site standards to safeguard walkability. To follow the recommendation to accommodate visible, experimental, or unique uses, the district could include a clause permitting uses that are deemed to be substantially similar to those explicitly permitted.

The C-2 district requires a 15-foot front yard setback for commercial buildings, measured from a right-of-way line in the previous Master Plan. Most of the corridor conforms approximately to this line in a consistent streetwall that could, if improved, provide an interesting and safe feature for pedestrians and bicyclists. The unfortunate exception is the key intersection at Nine Mile Road, where the structure of a setback (it is a minimum requirement) allowed

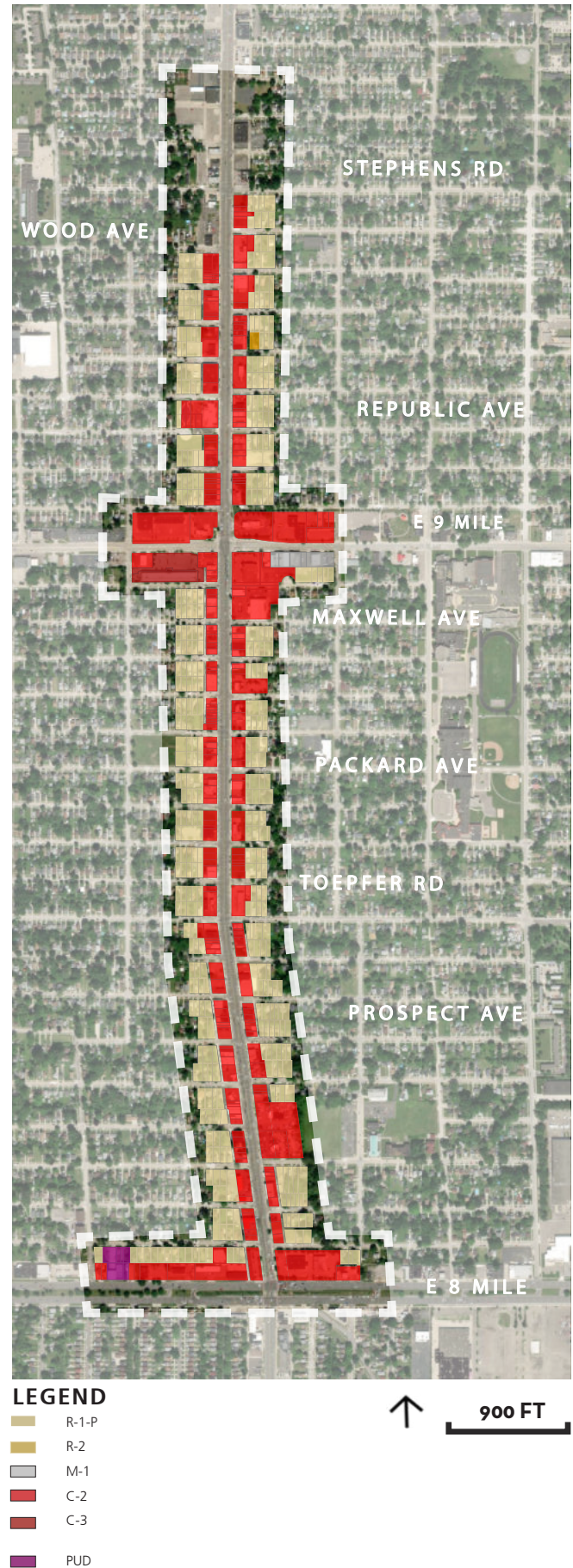
private business to prioritize car access in a way that significantly altered the functionality and experience of this critical node. The high traffic counts of both roadways offer visibility, distinction, and access, but the corner is filled with parking lots and drive-thru lanes instead of buildings that face each other in a cohesive environment. The setback should be replaced by a build-to requirement, which specifies where the front wall of a building shall be located in relation to the front lot line in order to enforce a consistent streetwall. The requirement can be provided in a range based on measurements of existing conditions.

The new build-to requirement should be written with generous accommodation and guidance for active outdoor uses like dining, retail, and entertainment. These should be considered amenities and provided with clear standards that address circulation, access, and aesthetics to support streamlined administrative permitting.

The current Warren Zoning Ordinance does not include strong requirements for access management, lighting, or landscaping that are intended to extend a comfortable public realm onto individual private properties. This is essential for the creation of a cohesive district and to fully achieve that comfortable experience. The ordinance should state a preference for site design that includes the fewest number of driveways, including consolidated access between parcels. Landscaping should be required in all parking lots, including tree wells, and on lots that are large enough to accommodate it. Lighting requirements should be tailored to produce a consistent experience from the street into the private building. The corridor is nearly entirely paved which presents a challenge to private landscaping. A site landscaping requirement that can be met with creative uses like hanging baskets, planters, window boxes, or living walls can offer some relief to the environment at a low burden to the applicant.

The condition of the building facades varies throughout the corridor, and the TIFA has an active grant program to help fund improvements. These investments will be best served by up-to-date design regulations that incorporate outdoor active uses, access management, lighting, and landscaping as well as key architectural features like window transparency. The results are most reliably and efficiently achieved when they are adopted directly into the Zoning Ordinance, rather than through stand-alone design guidelines or adding design review into the approval process. Such

Figure 1-18: Zoning



standards can be expected to be a bit more detailed here than in other parts of the City in order to achieve this distinctive, and corrective, result.

In exchange for compliance with these detailed regulations, the City should offer an approval process that is as swift and administrative as possible. Active, walkable uses should be permitted by right, with use-based standards where necessary rather than discretionary review. Auto-based uses should also get use-based standards primarily aimed at minimizing their impact on non-motorized travel, and may also include a discretionary review. The TIFA Board should submit written comments on every proposal in the TIFA District between Eight Mile and Stephens as part of the development review process.



Opportunities for outdoor dining are abundant along the corridor.



A vacant commercial property along Van Dyke Avenue.

## Sources

- 1 "Traffic Volumes", Michigan Department of Transportation, <https://lrs.state.mi.us/portal/apps/webappviewer/index.html?id=1a8bf6b2681d483ca9090ebec5d105ff>
- 2 "Smart Ride", Suburban Mobility Authority for Regional Transportation, <http://www.smartbus.org/Schedules/View-Routes>
- 3 United States Census Bureau, DP03 Selected Economic Characteristics in the United States, American Community Survey 5-Year Estimates, 2019.
- 4 United States Census Bureau, DP03 Selected Social Characteristics in the United States, American Community Survey 5-Year Estimates, 2019.
- 5 Smart Growth America, Dangerous by Design, 2016, <https://s3.amazonaws.com/cdn.smartgrowthamerica.org/dangerous-by-design-2016.pdf>
- 6 Macomb County, "Mobilize Macomb," 2017, [https://gis.macombgov.org/appsdev/mobilize/Mobilize\\_Macomb.pdf](https://gis.macombgov.org/appsdev/mobilize/Mobilize_Macomb.pdf)
- 7 US Department of the Interior, National Park Service, National Register of Historic Places, March 18, 2022 last updated. <https://www.nps.gov/subjects/nationalregister/index.htm> Accessed 12/20/2021



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# 2

# COMMUNITY ENGAGEMENT

Community engagement was an integral part of developing recommendations for the Van Dyke Corridor. This chapter summarizes the findings from various community engagement efforts including an interactive community survey, stakeholder engagement, and engagement with city officials. While community engagement efforts primarily focused on Warren residents, the term “community” broadly refers to all beneficiaries of the corridor, including (but not limited to) people who use the corridor to commute and business owners who may or may not reside in Warren.

## COMMUNITY SURVEY

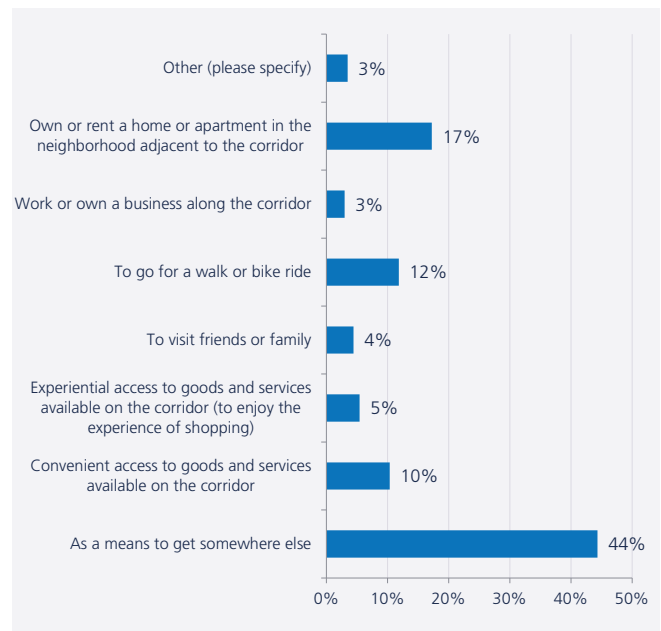
The City of Warren Van Dyke Corridor Plan Community Survey was designed to garner the community’s vision for the future of the Van Dyke Corridor and gauge their current and future preferences regarding land use patterns, infrastructure improvements, and redevelopment along the corridor. The survey was hosted on an online platform—SurveyMonkey—and promoted through postcards, stuffers in the water tax statements, social media, local newspaper, and the city’s website. Paper copies of the survey were available at the public libraries for those who could not access the online platform. A total of 199 online responses from respondents with Michigan zip codes and four paper responses were collected between August and November 2022 with a completion rate of 86%.<sup>1</sup>

### General Questions

The responses in this section provide an understanding of how the community uses the Van Dyke Corridor and the overarching challenges the community experiences along the corridor.

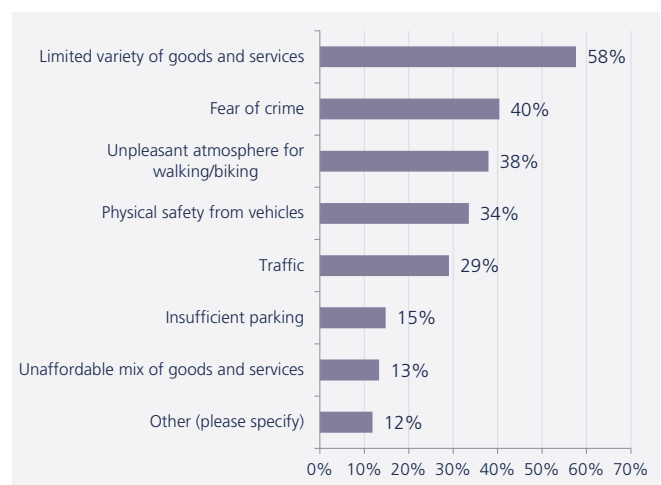
#### Question 1. What is the primary reason for using/visiting the Van Dyke Corridor?

The greatest proportion of respondents (44%) use the corridor as a means to get somewhere else; 17% reside in a neighborhood adjacent to the corridor; 12% use it to walk/bike; and 10% use it to access to goods and services. Only 5% of respondents visit the corridor for experiential shopping indicating a lack of business catering to them and potentially a lack of adequate parking and pedestrian infrastructure.



#### Question 2. What deters you from visiting Van Dyke more often? (Check all that apply)

The top three reasons deterring respondents from using the corridor more frequently include: limited mix of good and services (58%), fear of crime (40%), and unpleasant walking/biking experience along the corridor (38%). Nearly 30% of respondents also noted traffic as a reason discouraging them from frequenting the corridor. The responses suggest that while there is interest from the community to use the corridor, a shortage of thriving destinations, stigma of crime, and mobility and infrastructure challenges, restrict the functioning of the corridor to a throughfare.

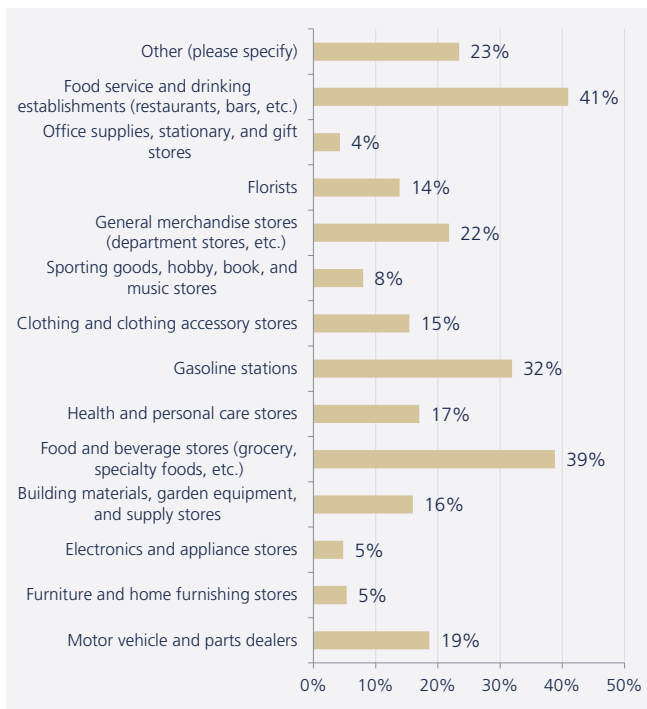


## Land Uses / Businesses

The responses to questions in this section help illustrate the community's current and future preferences regarding land uses and business mix on the Van Dyke Corridor.

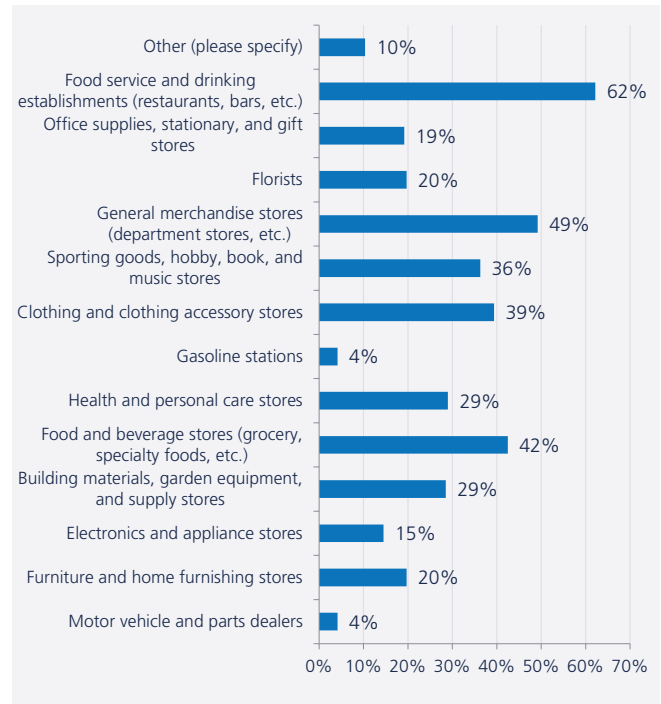
### Question 3. What types of businesses do you currently visit on the corridor? (Check all that apply)

Restaurants and drinking establishments were the most frequented businesses by the survey takers (39%), followed by food / beverage / grocery stores (39%) and gasoline stations (32%). This pattern closely follows commonly observed land use trends along major corridors in the region which tends to feature drive throughs, convenience stores, and automobile service stations. Office supplies / stationary / gift stores and furniture and homes furnishing stores as well as electronics / appliance stores were the least visited business typologies (4%, 5% and 5% respectively).



### Question 4. What types of businesses would entice you to visit the corridor more frequently? (Check all that apply)

Most respondents indicate interest to continue visiting restaurants and drinking establishments (62%) and food and beverage stores on the corridor. About one half of survey takers also expressed interest in frequenting general merchandise stores, currently visited only by 22% (see question 3), indicating a need to increase the business mix in this category. Respondents also note that they support an increase in apparel stores (39%), sporting goods / hobby / book / music stores (36%) and health and personal care stores. Some other responses noted were antique / thrift stores, coffee shops, pet stores, and event venues with programming along the corridor. Overall, the community demonstrates a strong preference for a healthy mix of businesses along the corridor.



## Mobility: Walking

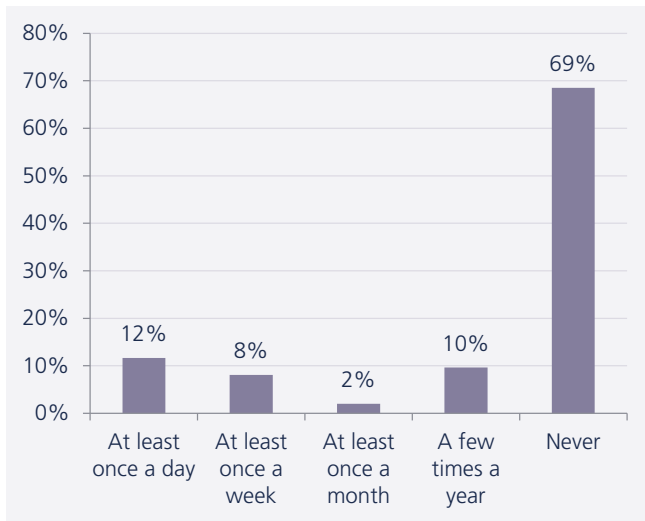
The responses in the section provide an understanding of how the respondents experience walking along the corridor.

### Question 5. Do you walk along the corridor?

Only one-quarter of respondents walk along the corridor.

### Question 6. How often do you walk along the corridor?

Only 12% of respondents walk everyday while close to 70% never walk along the corridor.



### Question 7. Do you walk along the corridor by choice or by necessity?

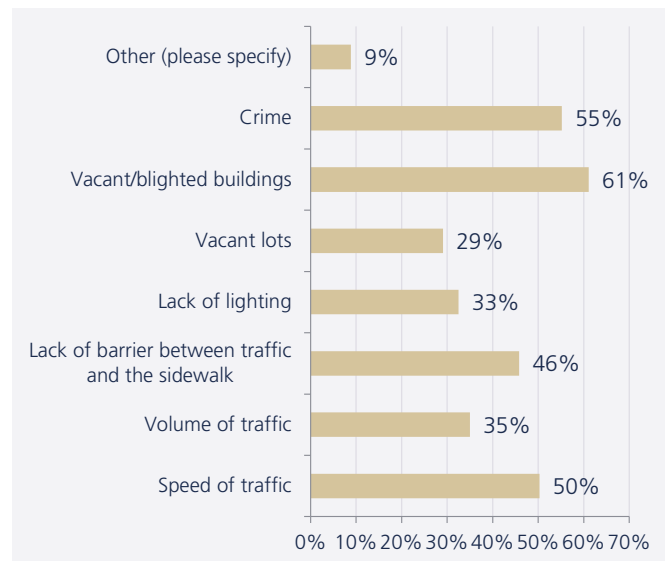
Over one half of the survey takers (52%) walk along the Van Dyke corridor out of necessity while and remaining 48% walk by choice.

### Question 8. On a scale from 0 (completely unsafe) to 10 (very safe), how safe do you feel when walking?

On average, respondents rated the pedestrian safety along the corridor as a four out of ten.

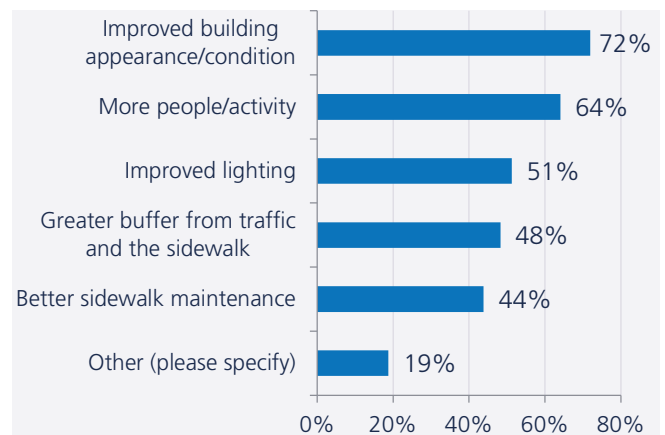
### Question 9. What negatively impacts your feeling of safety? (Check all that apply)

The top reasons impacting safety of pedestrians include blighted buildings (61%), fear of crime (55%), high speed of traffic (50%), and the lack of a barrier between traffic and the sidewalk (46%). Some other reasons listed by respondents were the appearance of the area, shortage of destinations encouraging foot traffic, the condition of the existing sidewalks, absence of crosswalks, and the lack of landscaping.



### Question 10. What are the most important features that would improve your feeling of safety? (Check all that apply)

Almost three-quarters of the respondents indicated that improving the appearance / conditions of buildings would improve the feeling of safety. More activity along the corridor, improved lighting, and better pedestrian amenities are other important priorities noted by respondents. Almost all responses suggest a need to revitalize buildings, activate the corridor with storefronts, events, and landscaping, and create a safe environment for pedestrians.

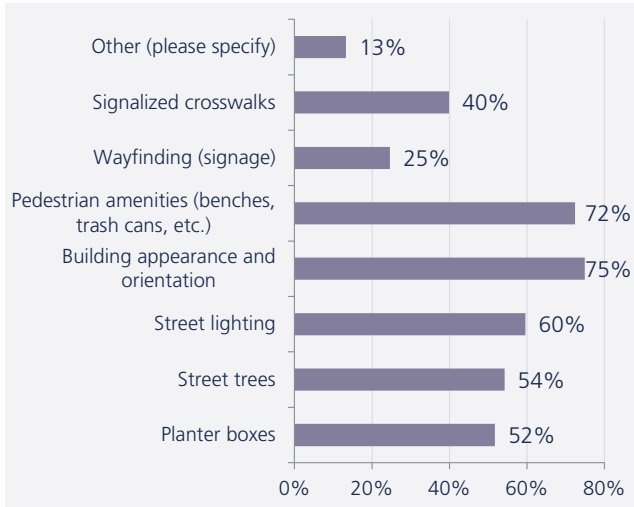


### Question 11. On a scale of 0 (completely unappealing) to 10 (very appealing), how appealing is your walk along Van Dyke Corridor?

Respondents rated their walking experience along the corridor below average, with an overall rating of three out of ten.

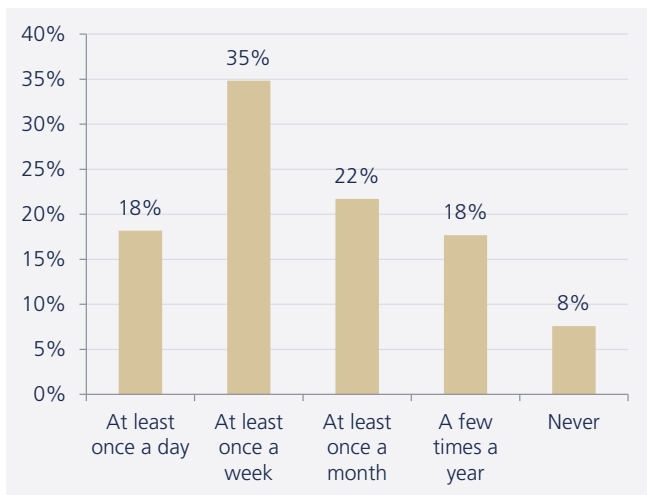
**Question 12. What are the most important elements that would improve the attractiveness of your walks? (Check all that apply)**

About 75% of survey takers indicated that revitalizing buildings and adding amenities such as street furniture would make the corridor more appealing for pedestrians. More than 50% of respondents also indicated that adding landscaping elements such as planter boxes and street trees would make walking along the corridor a better experience.



**Question 13. If your suggested improvements were made, how often would you walk along the corridor?**

Over half of all respondents would walk the corridor at least once a week if the pedestrian amenities and experiences were improved. It is also important to note that if these suggested improvements were made, the percentage of respondents who would never walk on the corridor would drop from 70% to 8%.



## Mobility: Biking

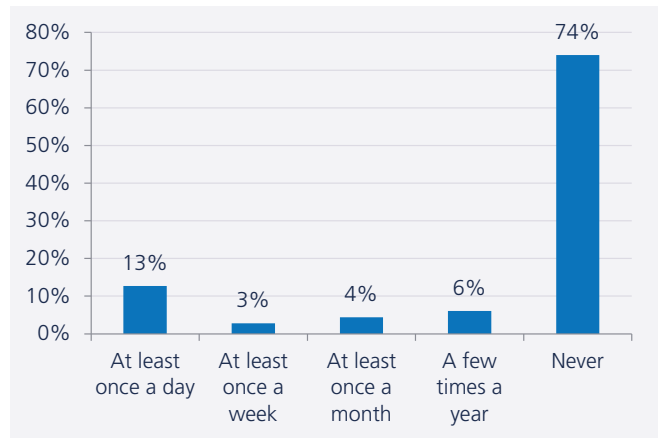
The responses in the section provide an understanding of how the respondents experience biking along the corridor.

**Question 14. Do you bike along the corridor?**

Only 21% of respondents bike along the corridor.

**Question 15. How often do you bike along the corridor?**

Among the respondents who bike on the corridor, 13% bike every day.



**Question 16. Do you bike along the corridor by choice or by necessity?**

About 64% of respondents bike by choice and the remaining 36% out of necessity.

**Question 17. On a scale from 0 (completely unsafe) to 10 (very safe), how safe do you feel when biking?**

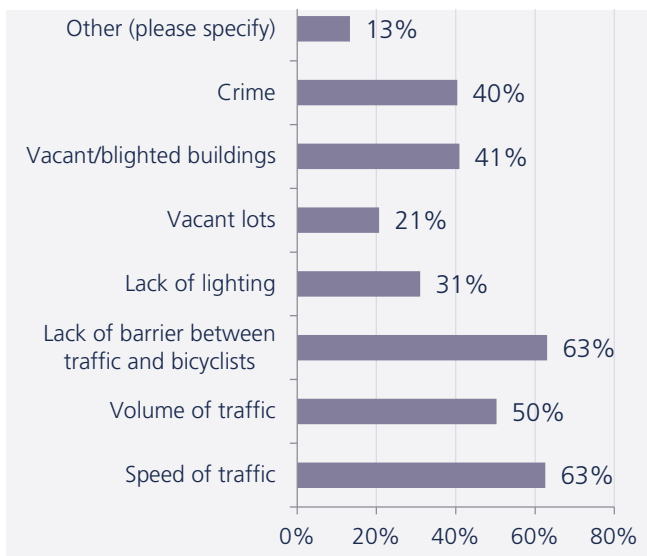
On average respondents rated the safety along the corridor a three on ten, indicating most of them don't feel safe biking on the Van Dyke Corridor.

**Question 18. What negatively impacts your feeling of safety as a bicyclist? (Check all that apply)**

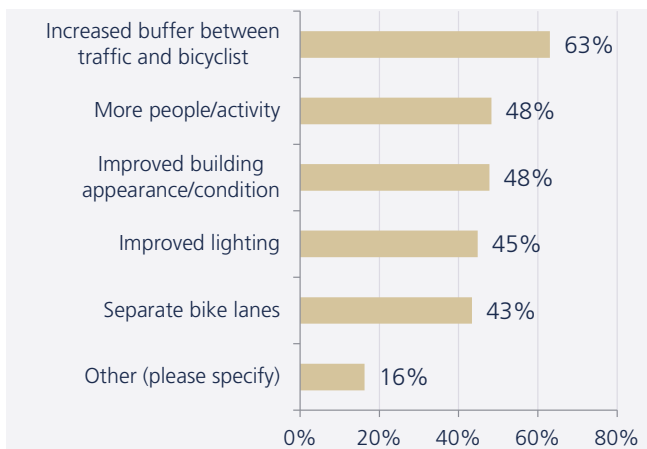
The top three reasons impacting safety of bicyclists include speed of traffic (63%), lack of a barrier between traffic and bicyclists (63%), and the volume of traffic (50%).

**Question 19. What are the most important features that would improve your feeling of safety? (Check all that apply)**

About 63% of the respondents indicated that increasing the buffer between traffic and the bicyclists would improve the feeling of safety. One half of all



respondents also note that improving the appearance of buildings and better programming and more people on the corridor as important factors to enhance safety. Some other responses include better police surveillance to prevent cars from driving on bike lanes, reducing speed limit, and adding road safety signage.



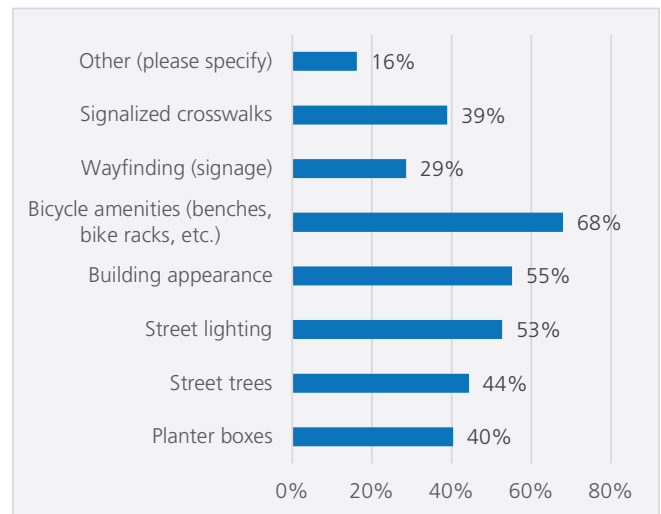
**Question 20.** On a scale of 0 (completely unappealing) to 10 (very appealing), how appealing is the bike lane?

Respondents rate the appeal of the bike lane along the corridor below average, with an overall rating of three on ten.

**Question 21.** What are the most important elements that would improve the attractiveness of your bike rides? (Check all that apply)

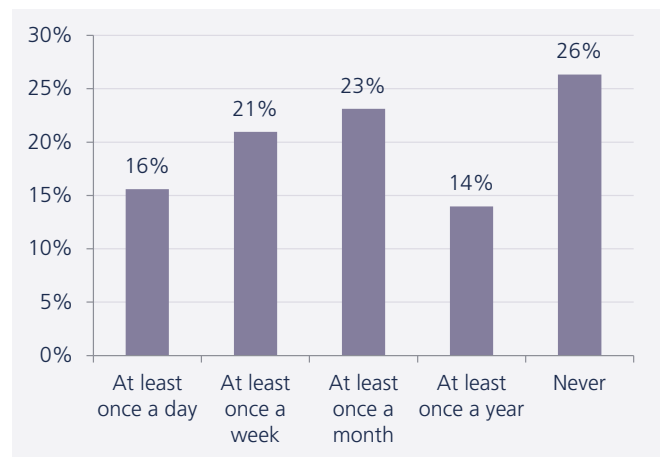
About 70% of survey takers indicated that adding bicycle amenities such as benches and bike racks would make the corridor more appealing for bicyclists. Over half of the survey takers would like to see

improvements in street lighting and the appearance of buildings along the corridor. Approximately 45% of respondents also indicated that adding landscaping elements such as planter boxes and street trees would make walking along the corridor a better experience.



**Question 22.** If your suggested improvements were made, how often would you bike along the corridor?

Responses indicate that approximately 40% of respondents would bike the corridor at least once a week if the required amenities were provided. It is also important to note that if these suggested improvements were made the percentage of respondents who would never bike on the corridor would drop from 74% to 26%.



## Mobility: Transit

The responses in the section provide an understanding of how the respondents experience transit access along the corridor.

**Question 23. Do you take the bus (SMART) from the corridor?**

Only 16% of the survey takers use the SMART bus services from the corridor.

**Question 24. On a scale from 0 (completely unsafe) to 10 (very safe), how safe do you feel when accessing transit?**

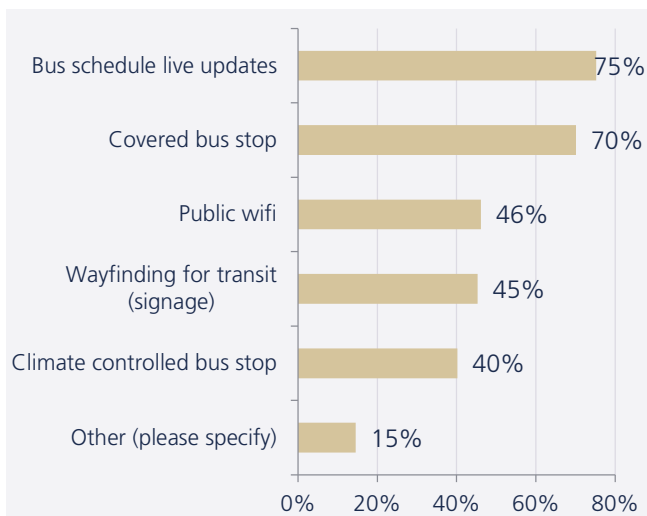
On average respondents rated safety while accessing transit on the corridor a four out of ten.

**Question 25. On a scale from 0 (completely uncomfortable) to 10 (very comfortable), how comfortable do you feel when accessing transit?**

On average respondents rated the comfort while accessing transit on the corridor a four out of ten.

**Question 26. What would improve your experience at the bus stop? (Check all that apply)**

Respondents indicate the top three upgrades that will improve the experience at bus stops as live bus schedule updates (75%), covered bus stops (70%), and public wi-fi (46%). Other improvements mentioned by respondents include police surveillance, amenities such as benches and trash cans, and overall upkeep of bus stops.



### Branding

The responses in this section gauge if the community would like to re-brand the corridor.

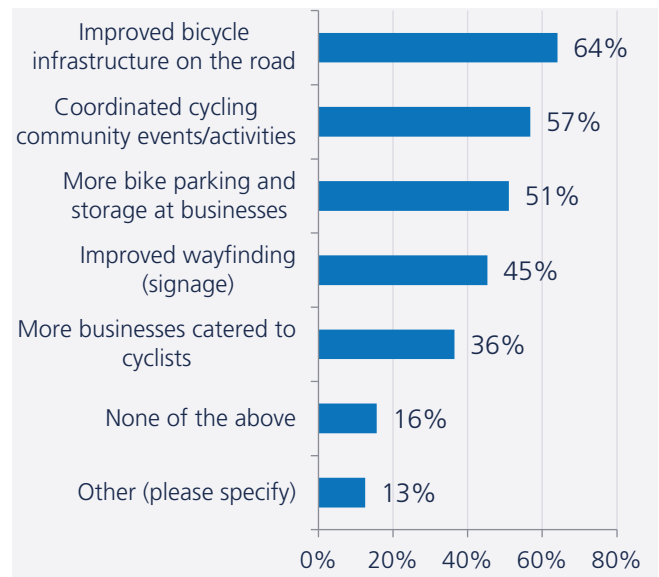
**Question 27. Do you think the corridor would be improved if it had a brand or identity associated with it?**

Approximately 64% of respondents agree that the

corridor would be improved if it had a brand or identity associated with it.

**Question 28. The Iron Belle Trail is a 2,000-mile journey winding from Ironwood in the western Upper Peninsula to Belle Isle in Detroit. This trail runs along the Van Dyke Corridor. What would you like to see done to capitalize on this? (Check all that apply)**

Most respondents suggest that to capitalize on the Iron Belle Trail it should improve the bicycle infrastructure (64%), coordinating cycling community events / activities (57%), and increasing the bike parking and storage facilities along the corridor (51%).



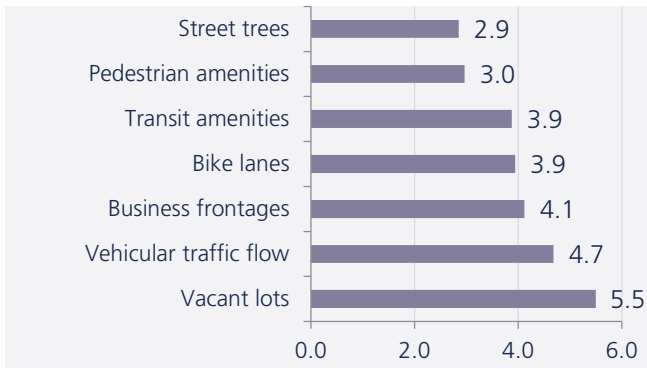
### Design

The responses in the section of the survey help identify the current corridor characteristics that the community values and prioritizes for future improvements.

**Question 29. What features of the corridor, in its current condition, appeal most to you? (Rank from highest to lowest, with 1 being the highest)**

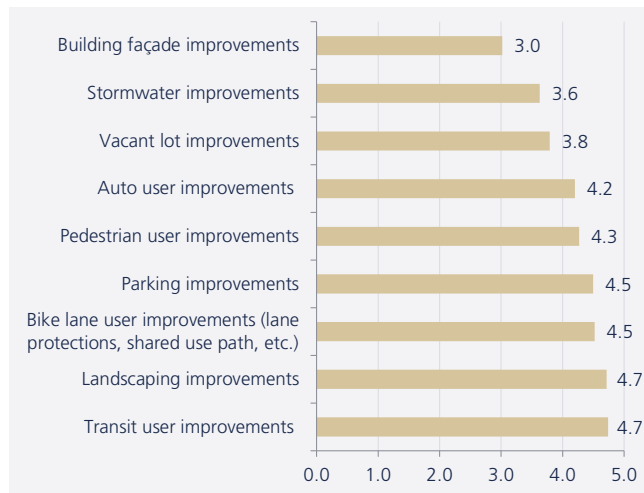
Overall respondents rate street trees as the most appealing feature, followed by pedestrian amenities. Vehicular traffic and vacant lots are the features, in its current condition, that appeal the least to the respondents. Given that respondents also indicated that blighted buildings, vacant lots, and speed of traffic deter them from walking / biking on the corridor (see question 9 and 18) addressing these concerns will be pivotal in improving the experience along the corridor.





**Question 30. What is most important to improve along this corridor (1 is most important)?**

Reiterating the priorities identified in question 29, respondents rate building façade improvements, stormwater improvements, and vacant lot improvements as the top priorities to improve along the Van Dyke Corridor.



**Question 31. Please prioritize the following potential corridor improvements from most important (1) to least important.**

Street trees, signalized crossings, and building façade improvements are rated the top priorities for improvements along the corridor.

**Question 32. What additional design features would improve your experience of the corridor?**

The most common responses to this open-ended question are listed below:

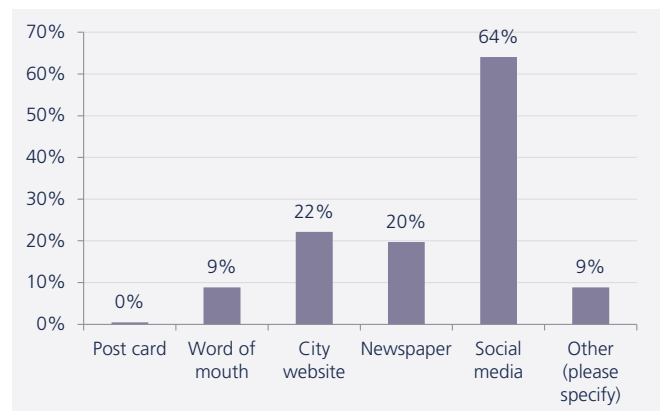
- » New aesthetic / creating a “fresh look” for the corridor
- » Revitalizing blighted buildings

- » Re-purpose vacant buildings
- » Outdoor seating at restaurants
- » Bring the storefronts closer to the street
- » Adding crosswalks and wayfinding signage
- » Better marking for bike lanes
- » Green infrastructure additions
- » Increase tree canopy / use trees to buffer the traffic from the side walks
- » Maintenance and upkeep of the corridor



## Tell Us About Yourself

This section collects demographic information of the respondents.

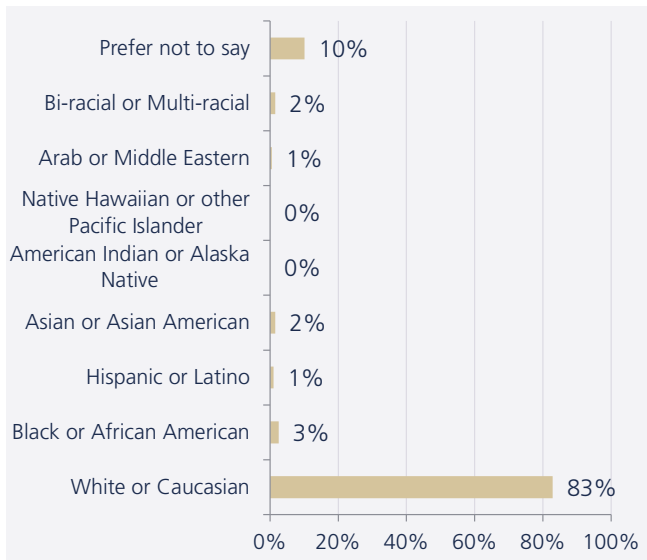


**Question 33. How did you hear about the survey?  
(Check all that apply)**

About 65% of respondents heard about the survey through social media, 22% via the city website, and 20% through the local newspaper.

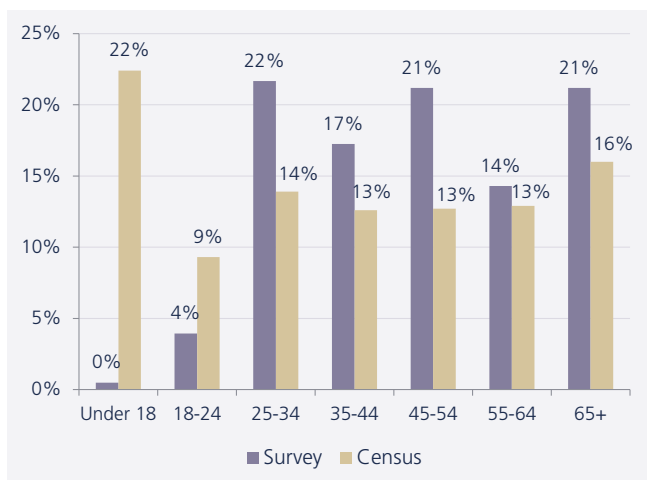
**Question 34. What race or ethnicity do you identify with?**

The majority of respondents (83%) identify as White or Caucasian.



**Question 35. What age group do you fall into?**

Survey respondents skewed older, compared to Warren’s population. Ages 25 and above were overrepresented while ages 25 and younger were underrepresented. However, young children are not the target audience for this survey, which contributes slightly to skewed results.



## STAKEHOLDER ENGAGEMENT

The community engagement efforts of the Van Dyke Corridor Plan also included a stakeholder engagement session where an array of stakeholders provided their inputs by completing a Strength, Weakness, Opportunity, and Threat (SWOT) Analysis. The primary objective of a SWOT analysis is to help organizations develop a full awareness of all the factors involved in decision-making. The SWOT analysis guides the recommendations and strategies in the plan, with a focus on leveraging strengths and opportunities to overcome weaknesses and threats. Stakeholders also identified priorities for preservation and change. The stakeholder engagement involved representation from an array of groups including:

- » Business Owners,
- » City Staff,
- » TIFA Board,
- » Van Dyke Public Schools, and
- » Beautification Commission

### Strengths

Stakeholders identified the historic character of the corridor as a major strength of the Van Dyke Corridor. The assessment chapter details the historic inventory fieldwork and a detailed description of identified historic properties and preservation resources may be found in the Appendix. Additionally, the implementation strategy also focuses on capitalizing on historic preservation as a redevelopment tool. Transportation characteristics such as existing bike lanes and the street network are foundation pieces of multi-modal infrastructure which is identified as an important avenue to activate the corridor and make the corridor more accessible.

### Weaknesses

Stakeholders indicate consensus that the biggest weakness along the corridor is the condition. The land use recommendations in the plan are tailored to address several of the identified weaknesses such as blighted properties and vacancies, lack of destinations, and parking requirements while the design recommendations aim to address the streetscapes, walkability, landscaping, and signage along the corridor. While the geographic isolation of the corridor is identified as a weakness, it can be reframed as an opportunity. Warren is big – it’s a city

**Table 2-1: SWOT Analysis Results Summary**

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>» Historic character (2)</li> <li>» Ample parking (1)</li> <li>» Attractive lot sizes (1)</li> <li>» Availability of funding for aesthetic improvements (1)</li> <li>» Bike lanes (1)</li> <li>» Community spaces (1)</li> <li>» Good mix of businesses (1)</li> <li>» Good street network (1)</li> <li>» Regional location (1)</li> <li>» Presence of diverse age groups (1)</li> <li>» Proximity to major transportation routes (1)</li> <li>» Strong community (1)</li> <li>» Diversity of lot sizes (1)</li> </ul>	<ul style="list-style-type: none"> <li>» Blight (3)</li> <li>» High vacancies (3)</li> <li>» Outdated zoning ordinances (3)</li> <li>» Poor maintenance of streetscape (3)</li> <li>» Crime/perception as a dangerous area (2)</li> <li>» Lack of destinations (2)</li> <li>» Lack of safety for pedestrians and bikers (2)</li> <li>» Lack of walkability (2)</li> <li>» Aging aesthetics (1)</li> <li>» High parking requirements (1)</li> <li>» Lack of signage (1)</li> <li>» Lack of trees (1)</li> <li>» Isolated from the rest of Warren (1)</li> <li>» Poor lighting (1)</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>» Utilize existing programs to aid businesses (e.g.: façade improvement grants) (2)</li> <li>» Adding signage and wayfinding (1)</li> <li>» Availability of space for new development (1)</li> <li>» Desire/Potential for mixed-use (Retail on first floor, residential above) (1)</li> <li>» Potential to create a fresh aesthetic (1)</li> <li>» Presence of large-scale manufactures (1)</li> <li>» Programs for neighborhood stabilization (1)</li> <li>» Proximity to large employers (1)</li> <li>» Proximity to Iron Belle Trail (1)</li> <li>» Revise zoning ordinance (1)</li> </ul>	<ul style="list-style-type: none"> <li>» Crime/perception as a dangerous area (3)</li> <li>» No safety for pedestrians and cyclists (3)</li> <li>» Blight / Homelessness (2)</li> <li>» No market for residential development (1)</li> <li>» Proximity to other developed cities (1)</li> <li>» Staff shortages (1)</li> </ul>

Note: Number in (x) denotes the number of stakeholder groups that identified the mentioned characteristic as a strength, weakness, threat, or opportunity.

the size of a township, and because it's not defined by natural boundaries, it can be harder to identify unique places. Capitalizing on "south Warren's" isolation could lend a unique opportunity to re-brand the Van Dyke Corridor.

### Opportunities

The top opportunity identified by stakeholders was existing business aid, reiterating that funds are available to implement required changes. This ties into the "potential to create a fresh aesthetic," which is tied to other opportunities like adding signage and wayfinding, and its proximity to the Iron Belle Trail. Stringing these together can carve a revitalization

and branding campaign for the corridor. During the time of this plan, efforts were also underway to create mixed-use (retail on first floor and residential above) properties to activate the corridor. New residential development also brings people into the community which could be just the push needed to catalyze revitalization. More people living in the corridor equate to greater demand for businesses along the corridor, a resulting economic benefit.

### Threats

The biggest threat is safety, if you don't feel safe, you're not coming to the corridor. The perception of crime is often related to maintenance issues,

identified as weaknesses, and both land use and design strategies tackling maintenance issues will also address the “perception of safety” along the corridor. While pedestrian and bicyclist safety is a different issue, the design recommendations also address these issues.

## KEY TAKEAWAYS

The regional location and existing road system lends the potential to establish the Van Dyke Corridor as a destination in Warren. However, the existing environment is not welcoming to pedestrians or cyclists. Stakeholders bring concerns regarding auto orientation and indicate a strong preference to support multi-modal transportation along the corridor. The new bicycle lanes are a major win for the corridor and an excellent building opportunity. Further infrastructure improvements focused around improving bicycle and pedestrian safety will be pivotal in bringing about this change.

Incorporating green infrastructure and increasing the tree canopy will not only add to the aesthetics but help mitigate stormwater runoff and other unwanted consequences of development. A desire for greener everything was a major finding in the master plan process, and it was also noted that the landscaping in south Warren is not as lush as elsewhere. This

investment will pay major dividends.

There is also an urgent need to re-brand the corridor. Addressing crime and the perception of crime is a key step that will require collaboration among City departments and commissions. Blight, vacancy, and maintenance concerns exacerbate the lack of safety. Establishing design guidelines alongside a wayfinding program and well-designed public improvements can kick off a coordinated branding effort and improve the overall aesthetic of the corridor.

Encouraging infill development and redevelopment is vital to the revitalization necessary to reverse the consequences of blight and high vacancy. The plan identifies priority redevelopment sites and a desired business mix. Redevelopment and design goals can be furthered by updating the Zoning Ordinance to align with the zoning recommendations in this plan that include strengthening landscaping requirements and implementing design guidelines.

Lastly, planning and zoning are baseline requirements in business recruitment; most of the key activity is outside the scope of this plan. Business recruitment will play a crucial role in ensuring a healthy mix of uses and ensuring programming that caters to the needs of different demographic groups.



Van Dyke Avenue at Fisher Avenue northbound shows the current character of the corridor as vehicular-centric.

## Sources

- 1 The online survey collected a total of 516 responses; however, only 198 of the respondents recorded Michigan zip codes. Of the remaining survey takers, about 247 recorded outside Michigan zip codes and 70 did not answer the questions. To ensure data validity and to accurately capture the community’s input, this plan filters and analyses responses only from respondents with Michigan zip codes.

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# 3

## PHYSICAL DESIGN PLAN

## CORRIDOR DESIGN OVERVIEW

Van Dyke Avenue (M-53) connects the community of Warren to Detroit and has traditionally served as a transportation corridor. It is an artery for industrial and commercial establishments along Route M-53. The corridor’s present underutilization makes it an opportune area for comprehensive streetscape improvements. The existing roadway sets a foundation from which to create an expanded, highly functional, and aesthetically pleasing corridor that enhances the roadway for residents and provides an attractive destination for visitors.

Prioritization of improvements to its physical design is important, requiring targeted streetscape design elements that address blight, high vacancy rates, poor streetscape maintenance, and lack of safety for pedestrians.

To create a distinct sense of character and place for the corridor, design recommendations based upon existing conditions and unique community needs are identified in this study. Suggested design recommendations seek to improve the visual character of Van Dyke Avenue and facilitate a safer and more welcoming streetscape environment that supports residents and corridor businesses. To this end, key design objectives of the suggested improvements include:

1. Improve access, safety, and comfort for non-motorized users (including transit riders)
2. Reduce perceived scale of vehicular uses
3. Reduce perceived speed appropriateness and increase driver awareness of non-motorized users
4. Increase non-motorized permeability along the corridor with frequently spaced, improved crosswalks
5. Physically separate motorized and non-motorized users
6. Facilitate connections to local and regional non-motorized trails
7. Enhance non-motorized users’ experience with improved character and amenities
8. Provide additional canopy street trees and land-use buffer plantings to improve non-motorized user comfort and environmental sustainability

## Corridor Design Opportunities & Constraints

The Van Dyke Avenue Corridor’s existing configuration sets a great foundation for design enhancements. To tip the scale from a motorized vehicle-centric corridor to a multi-modal corridor, consideration of the existing opportunities and constraints were analyzed.

**Table 3-1: Design Opportunities & Constraints**

Opportunities
Existing painted north and south-bound bike lanes provide the foundation for integration of barrier-protected lanes without altering lane widths or curb lines.
Existing young street trees and scoring areas in pavement for new wells support expansion of the street tree canopy.
Wide existing sidewalks present opportunities for improved pedestrian amenities and placemaking elements such as public art.
Redundant drive approaches along the corridor can be reduced to support pedestrian safety and accessibility.
Existing transit amenities can be bolstered through the provision of additional pedestrian amenities.
Street lighting exists the length of the corridor and can be enhanced through the integration of additional pedestrian-scale lighting fixtures. Existing post-top lighting includes planter baskets and opportunities for seasonal lighting.
Constraints
Limited on-street parking presents a barrier to attracting visitors, and clearly defined parking areas must be identified and established for points of interest along the corridor.
Maintenance of streetscape design elements is imperative to a successful streetscape design. Limited funding and staffing for regular maintenance must be addressed to ensure its quality over time.
Utility and infrastructure conflicts identified through a land survey may impact areas of the corridor design.

## Corridor Design Specifics

This section details design recommendations and improvements along Van Dyke Avenue, divided into categories that include enhancements to mobility, design, and community branding. The design recommendations are categorized based upon priorities identified by the steering committee and community engagement sessions informing the design. The design improvements are also largely defined by understanding existing conditions and land use analysis.

### Corridor Design Improvement Categories

- » Mobility
- » Beautification
- » Community Branding

#### Mobility

Mobility-focused design interventions along the Van Dyke Avenue Corridor support the reduction of traffic speed, enhanced pedestrian safety and comfort, improved non-motorized connections, and integration of accessible design features. The physical design recommendations include the following:

#### Protected Bike Lanes

Protected bike lanes are located as the outside lanes of the roadway, adjacent to the existing curb line,

### Mobility-Focused Design Interventions

- » Protected Bike Lanes
- » Enhanced Non-Motorized Network Connections
- » Improved Sidewalk Pavement & Formalized Pedestrian Crosswalks
- » Expanded Streetscape Lighting
- » Pedestrian and Transit Stop Amenities

and greenway pavement markings are proposed at intersecting roadways and driveways to serve as visual awareness for both bicyclists and drivers. The study's steering committee preference is to aim for the highest impact design through use of a 6-foot bike lane with a combination of planter islands. The existing bike lane barrier widths support landscape plantings and paved barrier islands where barrier lanes are not wide enough to include plantings. In addition to the function created by a physical barrier between cyclists and vehicular traffic, planter islands can serve to visually reduce the width of the roadway which naturally reduces traffic speeds. It should be noted that use of raised curb islands/planters could also provide stormwater management functions, detailed in the following Design section of this report.

#### Enhanced Non-motorized Network Connections

To achieve an effective non-motorized transportation system that provides resident access to and from essential goods and services, it is critical that improvements within the Van Dyke Avenue Corridor connect to regional non-motorized pathway networks and destinations. One regional pathway, the Iron Belle Trail, already exists. The existing bike lanes in this corridor design are proposed to be further enhanced using physical barriers to protect users from motorized traffic in "protected bike lanes." Additionally, SEMCOG's planned bikeway network indicates a future regional pathway along Nine Mile Road intersecting the study area.



Curb island planters protecting bike lanes.

#### Improved Sidewalk Pavement & Formalized Pedestrian Crosswalks

Existing sidewalks along Van Dyke Avenue range in condition from like new to very poor. The very poor sections exhibit cracking, settlement, heaving, or other degradations that create tripping hazards. All



sidewalks should be subject to a detailed condition review and be replaced as needed. Pedestrian curb ramps should be reviewed and brought up to current accessibility standards.

Formalized pedestrian crosswalks are proposed at signalized intersections and signalized midblock crossings. The proposed condition includes a total of twelve signalized intersection crosswalks and six signalized midblock crossings. On average, formalized crosswalks occur at approximate three block intervals along the corridor. Crosswalks would include pavement markings, pedestrian curb ramps, and appropriate signage. Pedestrian phase signal timing should be programmed to allow adequate crossing time for the specific roadway width and condition at each crosswalk. At mid-block crossings, push button activated Rectangular Rapid Flashing Beacons (RRFB) are recommended on overhead mast arms to increase driver awareness of pedestrian presence.

#### Expanded Streetscape Lighting

Additional and consistent pedestrian-scale lighting is recommended along the Van Dyke Avenue Corridor. Enhanced streetscape lighting offers benefits that contribute to the safety, functionality, and overall experience of a streetscape. Benefits of enhanced lighting include increased visibility and safety, crime prevention, improved wayfinding, increased pedestrian comfort, improved accessibility, and highlighting special urban features. Van Dyke Avenue currently has existing cobra style lighting and post-top lighting, providing a good foundation of lighting along the corridor. Expanded pedestrian scale lighting is recommended for the corridor through the addition of



'Piano bar' crosswalk striping enhances visibility of pedestrian crossings.

Figure 3-1: Potential Midblock Crossings & Locations for Landscape Median



#### LEGEND

- - - - - POTENTIAL MIDBLOCK CROSSING
- - - - - POTENTIAL LANDSCAPE MEDIAN ISLANDS





Rectangular Rapid Flashing Beacons (RRFBs) can be utilized at midblock crossings to improve safety for pedestrian crossings.



Existing post-top lighting along the corridor is recommended to be expanded or installed at shorter intervals to improve pedestrian-scale lighting along Van Dyke Avenue.

lighting at more frequent intervals. Additional lighting should be considered for activated areas that may be associated with revitalized vacant lots and areas of special paving along the corridor. Improving the corridor's lighting supports a positive aesthetic and sense of place along Van Dyke Avenue. New lighting should match existing decorative pole/fixture types on Van Dyke Avenue, and be fed by underground power infrastructure to eliminate existing overhead lines and support effective street tree canopies.

### *Pedestrian & Transit Stop Amenities*

Improvements are suggested at transit stops to support transportation equity and the comfort and safety of users. The City and SMART should work collaboratively to evaluate and implement suggested improvements for the benefits of their mutual constituents. At bus stops with significant ridership or those located near key destinations, improvements should include shelters, litter receptacles, transit maps and schedules, community information, and other user amenities. Climate controlled bus stops and live bus schedule updates may advance comfort and frequency of use for transit users. Integrating access to public wifi along the corridor can also improve the user experience of the Van Dyke Avenue Corridor.

SMART buses currently have real-time updates available through several smartphone applications like Transit App, Google Maps, Via, and Applemaps. Including real-time arrival information at select bus stops can improve ridership and provide equitable access to bus schedules for residents without access to a smartphone.



Real-time passenger information sign at transit stops

## Design

Design-focused interventions along the Van Dyke Corridor include landscaping, revitalization and activation of vacant properties, stormwater management, and streetlighting. These design recommendations include:

### Expansion of the Street Tree Canopy

Street trees are proposed throughout the corridor to improve user comfort, visual character, and environmental sustainability. Healthy and vibrant urban street trees have proven positive impacts on commercial and retail environments, user enjoyment,

community health, and environmental quality. The Van Dyke Corridor has existing young street tree plantings, vacant street tree wells, or scoring in the existing walks where new street trees may be added.

Replacement of dead or dying existing street trees, and expansion of the street tree canopy through use of vacant tree wells and scored areas for tree wells, is recommended. For expedited visual and functional impact, new street tree plantings should vary in species and be installed at 2" - 3" caliper. Regular monitoring and maintenance of street trees is imperative for their longevity. Ensure that adequate resources are available to prune and water newly planted trees during dry periods.

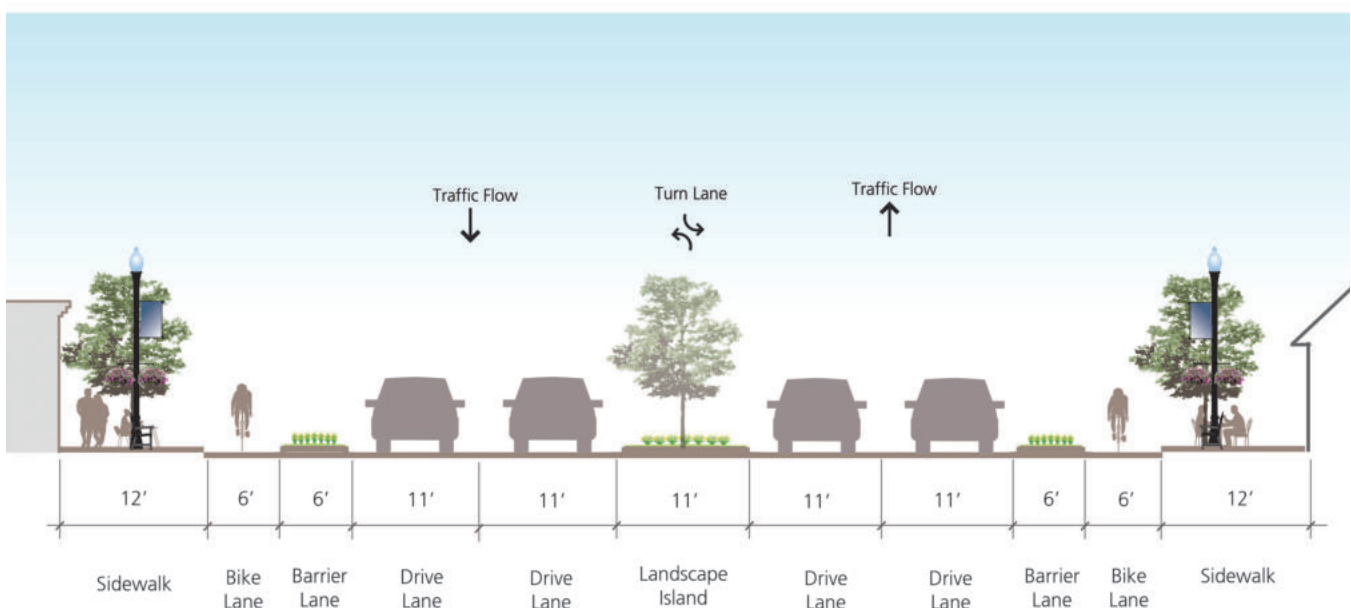
## Beautification-Focused Design Interventions

- » Expansion of Street Tree Canopy
- » Vegetated Median Islands
- » Landscaping and Screening of Existing Parking Areas
- » Stormwater Management
- » Areas of Special Paving
- » Revitalization and Activation of Vacant

### Vegetated Median Islands

The current configuration of the Van Dyke Corridor is five lanes (two northbound, two southbound, and a turning lane) bordered by bike lanes. This design recommendation integrates vegetated median islands or planting strips in specific areas of the existing turn lane. Vegetated median islands have multiple advantages. They improve streetscape aesthetics by breaking the monotony of concrete and asphalt and enhance pedestrian safety by providing refuge for pedestrians crossing the road. Vegetated medians also create a traffic calming effect by visually reducing the perceived width of the roadway for vehicular traffic. Additionally, incorporation of vegetated median

Figure 3-2: Proposed Streetscape Design Section



Design improvements include a vegetated barrier land that can be utilized for stormwater management and a landscaped median island within select areas of the turn lane that provides pedestrian refuge while crossing at select areas along the corridor.

islands, as with other landscape design features, can enhance air quality, reduce noise, support biodiversity, impart psychological benefits, and create a healthier environment for corridor users.

### *Landscaping and Screening of Existing Parking Areas*

Increased ordinance compliance is recommended for screening and buffering of some private development land uses, particularly vehicular use areas (parking/drives) and material storage yards. In many instances along the corridor, these uses directly abut the public right-of-way without physical separation or screening. Pedestrian comfort and aesthetic quality of the corridor could be greatly increased by screening/buffering these land uses per ordinance standards. Opportunities should be sought to bring non-conforming existing conditions into compliance, and screening/buffering should be made a high priority in site plan reviews for new development or redevelopment.

### *Stormwater Management*

Stormwater management plays a crucial role in the design of urban streetscapes where there is abundant impervious surface. Effectively managing stormwater



An example of landscape screening using herbaceous perennials to provide visual interest and mask parking areas.



An example of landscape screening using shrubs to mask existing parking already along the corridor.



Design improvements include expanding the street tree canopy by planting in existing empty tree wells, adding additional tree wells, and reducing spacing intervals between street trees to provide a more lush urban tree street tree canopy over time.

in the corridor supports flooding mitigation, water quality improvement, heat island effect reduction, and improves the aesthetic quality of the streetscape. In the case of Van Dyke Avenue, bike lanes protected by planter curb islands and vegetated median islands can serve a dual purpose in protecting cyclists and managing stormwater.

### *Areas of Special Paving*

Special paving can significantly enhance the Van Dyke Corridor by adding visual interest in targeted areas. It serves to break up the monotony of the prevalent asphalt and concrete. Special paving can also serve as a wayfinding feature when used to



Areas of special paving are recommended along the streetscape to provide visual interest and support wayfinding.

define areas of interest, plazas, and gathering spaces. The use of specific paving materials and patterns can also create a distinct sense of place and aesthetically enhance the streetscape.

### *Revitalization and Activation of Vacant Properties*

Activation and revitalization of vacant properties and lots can draw visitors to the corridor, improve aesthetics, increase economic activity, and create an increased sense of belonging. Vandalism frequently occurs on properties that are vacant and uncared for, leading to safety concerns for residents and amplifying negative perceptions. Thoughtful activation and revitalization of vacant properties along Van Dyke Avenue, temporary or permanent, can include space for farmers’ markets, vendors, community gardens, art installations, and microparks. Where revitalization includes landscaping and increased greenspace, these vacant properties can see the myriad benefits associated with increased greenspace as discussed in other areas of this report.

### **Community Branding**

Creating a unique brand for an urban streetscape



Community gardens are a great way to re-purpose underutilized vacant lots and cultivate community participation.



Utilizing vacant lots to host Farmer’s Markets or vendor spaces can serve as temporary (or permanent) methods to activate a space and draw residents and visitors to the corridor.



Microparks are a means to draw users to the corridor and can beautify vacant lots along the corridor.

## Branding-Focused Design Interventions

- Branded Banners
- Branded Street Signs
- Branded Area Maps & Directional Signage
- Interpretive Signage for Historically Significant Areas

involves developing a distinct identity and character for a specific area. Branding creates a sense of place and identity for a streetscape, distinguishing it from other areas. It supports increased recognition and visibility of a place, enhances visitor experience, contributes to economic development and investment, community pride, and placemaking. One theme to consider is a 'Bike Hub' as detailed in the Land Use Strategy Chapter (page 70). While the elements discussed in the mobility and design sections of this report contribute to overall streetscape branding, specific features that support creation of a unique corridor brand are detailed in this section. Recommended streetscape branding elements for the Van Dyke Corridor include:

### Signage & Wayfinding

Developing branded signage and wayfinding is crucial to the establishment of a streetscape brand identity. Branded signage provides an opportunity to create consistent and cohesive signage throughout the visual experience of a streetscape. Branding elements include logos, colors, typography, and visual signage that generate a recognizable identity. Integrating historical/interpretive signage can advance a positive user experience providing easy-to-follow directions and relevant information to streetscape users. Accessible signage and wayfinding elements in a streetscape can provide important information for pedestrian crossing areas, public transportation stops, accessible routes for individuals with disabilities, and the overall promotion of a safe and inclusive environment for users.

### Public Art

Branding of a streetscape can be significantly enhanced through the introduction of public art. Public art creates a distinct community identity that can reflect the cultural heritages, history, or character of



An example of unique wayfinding signage



An example of unique banners and wayfinding



An example of wayfinding signage for significant buildings and corridor features

an area and differentiate the streetscape from others. Public art installations also provide an opportunity for community engagement. Collaborative art projects in the community, in the form of murals, sculptures, or interactive installations foster a sense of community pride, ownership, and elevate a streetscape's unique brand. Public art along the Van Dyke Corridor can also create opportunities for social media marketing and economic development. The incorporation of public art into the streetscape can also serve as a tourist attraction, encouraging visitors to stop and engage with public art and local businesses along the corridor.

## Public Art Design Elements

- » Sculptures
- » Murals
- » Memorials
- » Temporary Art Installations



Warren's existing sculpture provides a great example of public art that can be replicated at different scales along the corridor.



Warren's existing sculpture provides a great example of public art that can be replicated at different scales along the corridor.



An example of unique murals to enhance building facades and draw attention to activate spaces along the corridor.

Figure 3-3: A Segment of the Proposed Corridor Design from Nine Mile to Lozier





Figure 3-4: Detail of Potential Signalized Mid-block Pedestrian Crossing at the New Maybelle Burnette Library with Police Mini Station and City Administration Office

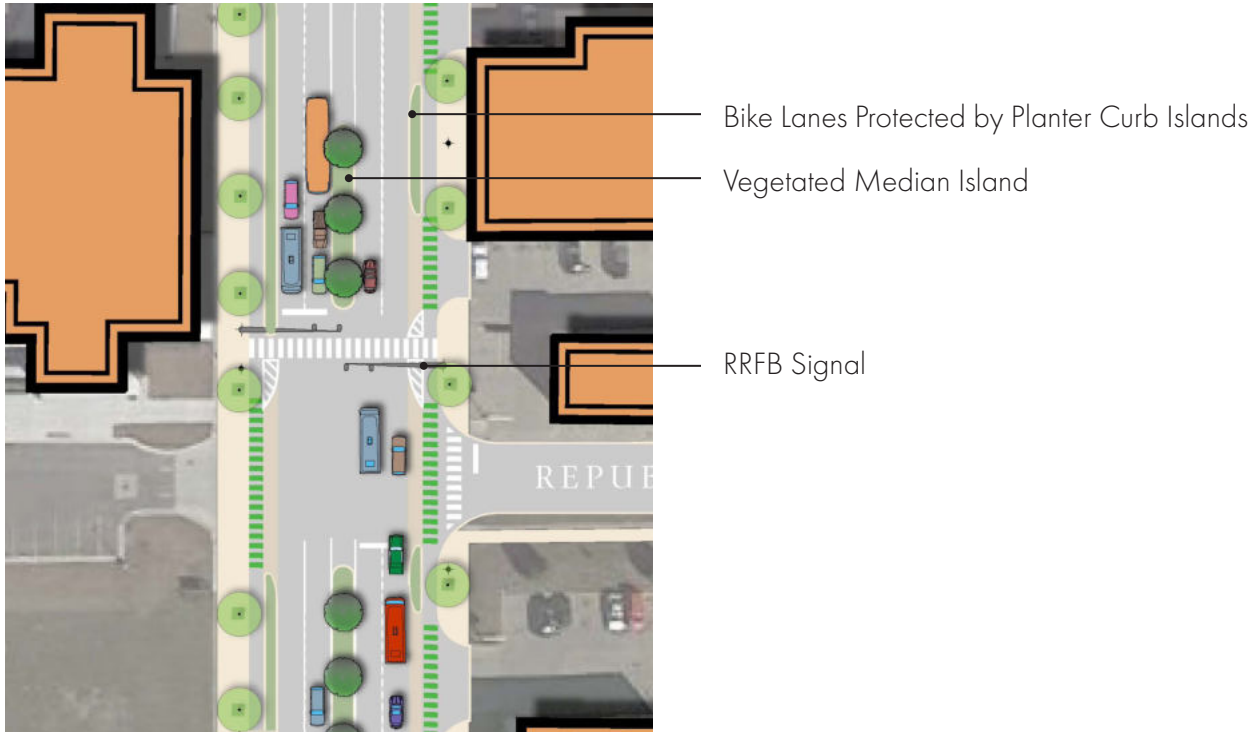
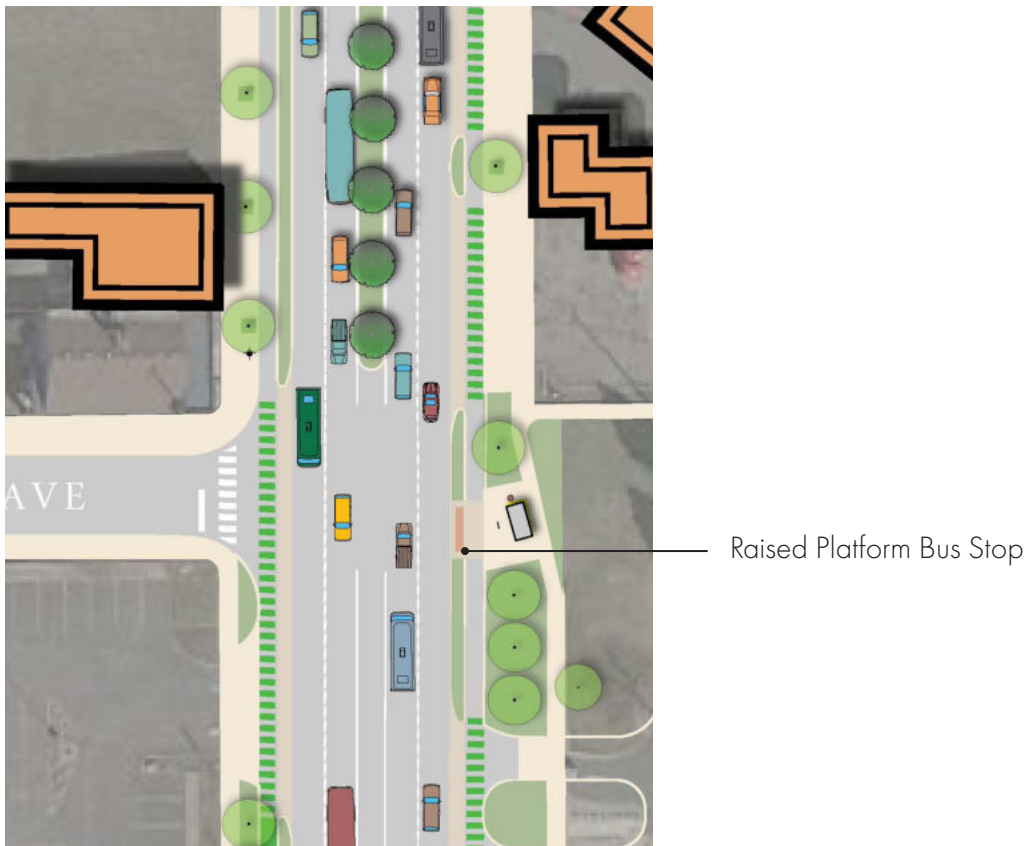


Figure 3-5: Detail of Potential Raised Bus Platform on Van Dyke Ave at Nine Mile Northbound



## MDOT/SEMCOG MULTI-MODAL TOOL

Michigan Department of Transportation (MDOT) and the Southeast Michigan Council of Governments (SEMCOG) developed a tool that supports the planning, design, and evaluation of five travel modes: automotive, freight, pedestrian, bike, and transit. The Modal Prioritization tool was used to analyze the various modes of transportation for the existing corridor and proposed design. The scores range from one to three, where one is the highest score and three is the lowest. Table 3-2 shows the summary of the SEMCOG Multi-Modal Tool Results.

### Countermeasures

Various MDOT, SEMCOG, and Federal Highway Administration (FWA) resources were used to determine viable countermeasures to improve the safety of Van Dyke Avenue for all users. These are low cost, easily implementable solutions identified as means to enhance safety along the corridor. These design interventions were included in the proposed

## Safety Countermeasures

- » High Visibility Crosswalk Markings
- » Sidewalks
- » Median with Marked Crossings
- » Pedestrian Refuge Islands
- » Advance Yield or Stop Markings & Sign
- » Rectangular Rapid Flashing Beacon (RRFB) or Pedestrian Hybrid Beacon
- » Leading Pedestrian Interval
- » Designated Bicycle Facility
- » Lane Repurposing
- » Wider Edge Lines
- » Longitudinal Rumble Strips & Stripes
- » Backplates with Reflective Borders

**Table 3-2: SEMCOG Multi-Modal Tool Results Summary**

Van Dyke Avenue (Eight Mile to Stephens Rd)					
Existing Conditions					
Mode	Priority	Tier	Score	Average Score	Objective Met?
Pedestrian	3	2	3	2.2	Not Met
Bike	4	2	3	2.00	Not Met
Transit	5	3	4	4.00	Not Met
Auto	1	1	1	1.00	Met
Freight	2	1	2	1.50	Met
Proposed Conditions					
Mode	Priority	Tier	Score	Average Score	Objective Met?
Pedestrian	3	2	3	1.89	Not Met
Bike	4	2	3	1.38	Not Met
Transit	5	3	1	1.00	Met
Auto	1	1	1	1.00	Met
Freight	2	1	2	1.50	Met

SEMCOG Multi-Modal Tool

plan for the Van Dyke Avenue Corridor but are listed here as supplementary items that support the overall enhancement of the corridor in the case that the full suite of design recommendations are not pursued.

An additional countermeasure to consider along the corridor is a Leading Pedestrian Interval (LPI). LPI allows additional time for pedestrians to enter crosswalks before any vehicles are given a green indication. This enables better visibility of pedestrians in a crosswalk before vehicles choose to make left or right turns.

Consideration for signalized intersections also include Backplates with Reflective Borders which provide an added measure of visibility making them more conspicuous in day and night conditions. Signal

poles, arms, and span wires must be reviewed before moving forward, as backplates add additional weight to these systems.

Pedestrian crossings proposed at key locations along Van Dyke Avenue should have enhanced crosswalks with high visibility crosswalk markings. Midblock crossings should utilize high visibility markings and Rectangular Rapid Flashing Beacons (RRFBs) or Pedestrian Hybrid Beacons (PHBs) as an additional traffic control and safety measure for pedestrians and bicyclists.

MDOT Safety countermeasure information can be found in Appendix G.



The lot south of the Maybelle Burnette Library is a great location for a Designated Bike Facility. Additional info is in the Land Use Strategy Chapter.



The intersection at Hupp Avenue and Van Dyke Avenue (northbound) is a prime candidate for high visibility crosswalk markings.



# 4 LAND USE STRATEGY

## OPPORTUNITIES AND CONSTRAINTS

There are plenty of land use opportunities along the Van Dyke Avenue Corridor. It is a well-traveled connector between Michigan’s first- and third-largest cities, intersected by a key regional corridor at Nine Mile Road. The corridor’s designated bike lanes and inclusion in the Iron Belle Trail are critical, brand-new assets that signal the potential for real character change. This character change, once in motion, transforms the corridor’s high vacancies into opportunities as new business types can cluster swiftly and build on both public investment and each others’ success. In particular, there are vacant parcels in proximity of the Civic Center South, the Baseline Feed Store, and the former Maybelle Burnette Library which could serve as catalyst sites supporting a transformative vision. Vacant parcels throughout the corridor also offer an opportunity for housing development, bringing new households and household types into the corridor’s user base and customer-shed.

The existing configuration represents an enormous investment in a commercial character, including wide sidewalks—increasingly buffered from traffic as the bike lanes become more protected—that are consistently lined with buildings and storefront windows. The Historical Assessment cited ten good candidates for sensitive redevelopment that preserves unique historic features. Two of these properties were identified as potential residential pilots (21351 and 21805 Van Dyke Avenue for second-floor residential development). During the writing of this plan, redevelopment efforts got underway on three



Existing vacant building along the corridor

contiguous properties that are cited as a potentially connected investment that could transform an entire block (23150, 23154, and 23158 Van Dyke Avenue).

All of these physical opportunities are supported by another type of opportunity: funding. Warren’s TIFA is equipped with the resources to strategically lead and support this transformation. Bold independent investment, leveraged with other public agencies, and grant-constrained financing of the private sector are three tools that can directly achieve its aims.

There are also constraints along the corridor. Existing blight and disinvestment are simultaneously generating expenses and dragging down revenue that feed a general perception of poor safety in the corridor. This perception is reinforced by the car-dominated design of the roadway, which severely prioritizes fast auto movement over bicycle or pedestrian comfort. Since the corridor is a state trunkline, final decision-making authority over design is outside local control. And to the extent that the corridor has a brand, it is one of being overlooked and isolated within the City of Warren. These are formidable constraints, but only one—road ownership—is fixed. The rest are the subject of this report’s recommendations.

## LAND USE STRATEGY

In general, the land use strategy for the Van Dyke Corridor centers around permitting housing, strengthening design requirements, and developing new activity centers.

The Future Land Use Map designates the corridor as a “mixed use node,” radiating outward from the intersection of Van Dyke and Nine Mile Roads. This category is intended to allow for moderate-density residential development as well as commercial uses. The introduction of housing onto the Van Dyke Corridor is a key change that will help transform the demand generated on the corridor, and should be implemented as soon as possible. However, the current standards for multifamily development in the current ordinance have large requirements for lot area per unit that do not support walkability, so simply adding residential uses into the existing C-2 district would actually reinforce, rather than transform, the existing character.

A new district is needed that more carefully addresses site development in this unique part of the City. Both the Master Plan and a previous study of this corridor call out a desire for features to make the corridor more comfortable, connected, and social, which can

be supported through façades, access, landscape, and lighting requirements. These private investments complement new public design expenditures, including branding and wayfinding, to improve the overall perception of the area. Existing commercial uses will generally be supported in this new district, and those uses that support a walkable character will be identified for streamlined, administrative, and/or by-right approval. A new clause permitting uses “substantially similar” to the permitted uses opens a pathway to support experimental or unique uses.

Good zoning is necessary but not sufficient to achieve a land use goal. There must also be a vision and active pursuit of it. Articulating this vision, directly investing in elements of it, and actively selling it as a business recruitment strategy will be the keys to implementation.

The Van Dyke Corridor land use strategy includes three new activity nodes that should be the primary targets for direct investment and support. Taken together, the implementation of these new nodes addresses some of the corridor’s biggest weaknesses as identified by stakeholders: isolation and lack of identity. Each node serves as a distinct kind of draw. The Bike Hub aims to offer local families as well as statewide trail users a defined bicycle destination. It also amplifies Warrenites’ strong desire, as recorded in the Master Plan, for non-automotive transportation options. The Feed Store / Little Door entertainment district restores nightlife to the south side of town by building on two beloved assets. And the Lincoln Youth Zone is a stretch goal that leverages family-centered investment to bring new households into the community, then leverages that development opportunity to further shape the corridor.

## Historic Building Cluster

Three of the five buildings in the corridor which were identified as having potential historical significance are adjacent to each other on the east side of Van Dyke Avenue between Cadillac and Maxwell Avenues: 22720, 22740, and 22760 Van Dyke Avenue. While many of the buildings identified in the Historic Assessment were included in one of the targeted activity nodes, these are largely functioning as intended and thus not part of a redevelopment vision. However, they are assets to the corridor, and are mentioned here so that they may be included as a direct investment target.

## Bike Hub

The Corridor presents an unparalleled opportunity to invest in a “bike hub” that will first and foremost serve local residents, and in so doing will provide an irresistible amenity to users of the Iron Belle Trail. The City should conduct a feasibility study to identify a site on that could be dedicated to bike amenities, such as a fix-it station, a “learn to ride” track, and perhaps a couple of facilities for low-intensity bike tricks. This outdoor area should be interspersed with facilities for a stop along the bike trail, including tables, chairs, shade, water, and restrooms (the library may serve this last purpose, especially in the beginning). Of course, bike parking should be plentiful, secure, and sheltered, if possible.

Eventually, these public investments should be complemented by adjacent businesses. The most immediate need is for small-scale food vendors offering refreshment to bodies that are engaged in active transportation. In the early stages, the TIFA could invest in small, temporary “pop-up” type structures to meet this need, placing them in the lot with the new bike and rest facilities. These can incubate new restaurant businesses, with the intention of identifying any that are successful enough to partner in the development of a new brick-and-mortar business. Ice cream, especially if it’s unique in any way, is a reliable draw.

This pop-up arrangement would also accommodate the development and incubation of niche retail businesses that will become a local and regional destination. Basic bike repair and maintenance supplies should be available for purchase. The hobby store across Van Dyke Avenue from the library is a perfect example of a type of business that a family may decide to spend a Saturday morning biking to, especially if there was some lunch available and they had library books due. Other similar examples might include a tea shop that hold events like fairy teas, or a comic book store. Over time, the pop-up structures themselves can become an asset to the TIFA by serving as a flexible, portable business incubator.

In the long term, these investments in the bike facilities, rest areas, and temporary commerce are intended to join with the TIFA’s support of the renovation of the corner building at 23158 Van Dyke, to spur the development of new buildings in the vacant lots across both Van Dyke and Continental Avenue from the library. Ideally, the Continental Avenue site would host a multi-unit commercial building, with residential



Surrounding the Maybelle Burnett Branch Library redevelopment is an opportune location to expand investment.

above, that would contain the businesses most closely associated with the bike hub. The site would be connected to the bike hub across Continental Avenue, behind the existing building at 23211 Van Dyke, to keep young bicyclists fully separated from Van Dyke. The ideal business for the 23211 building would be a bicycle showroom, especially one that includes electric, cargo, and trick bikes. This use would fully utilize the large building, and such a business would be eager to partner with the City and the TIFA Board to continually improve the bike hub.

### **Feed Store / Little Door Entertainment District**

Two of the community's most beloved sites, one historical and one modern, sit on the block between Fisher and Yacht on the west side of Van Dyke: the Base Line Feed Store and the former Little Door Theater. The former Little Door Theater was identified throughout the Master Plan engagement series as an under-heralded south Warren treasure, and a stakeholder lamented the loss of an entertainment district just north of Eight Mile. This plan offers an opportunity to pursue a revitalization anchored by the former Little Door Theater.

The historic assessment in this report calls the Baseline Feed Store building "a locally-designated, historic landmark awaiting to be redeveloped sympathetically with its rich history and connection to the Van Dyke Corridor." Separated from the former Little Door Theater by a small concrete parking area, a restaurant use in this building is not only the obvious pairing but also takes advantage of the wonderful pun. Transforming the too-small parking area between the two buildings into a shared outdoor space with dining, pre- and post-show beverages, seating, and lights would create a single, block-long, highly visible experience that could serve the adjacent neighborhoods while attracting the attention of passers-by.

The growth and fostering of this district will require continuously adjusting the parking arrangements. It's important to keep in mind that parking is a byproduct of every vibrant, walkable place, simply because cars are bigger than people—the reward for solving an economic development problem is a parking problem. In this case, parking will first be needed for the restaurant/theater block. Existing on-street parking along both Fisher and Yacht should be counted, and a shared parking arrangement with the lots behind the



The neighboring lot and ReStore near the Maybelle Burnett Branch Library is an opportune location to expand investment.

buildings between Yacht and Westminster should be explored. Parallel parking along the alley may provide a few more spaces.

The strategy is that by the time the Feed Store / Little Door block regularly generates too much business for this arrangement to handle, the new activity will support recruitment of one or more entertainment businesses to the available property at 21227 Van Dyke Avenue in the block to the north. Since that lot has been providing parking to the Feed Store / Little Door block, its redevelopment will add pressure to the parking situation. That would be the right time for the TIFA to implement a small-scale independent parking solution, ideally at the southwest corner of Westminster and Van Dyke.

This arrangement, if well-designed, could help facilitate a stretch goal of expanding the entertainment district even further. A property identified as a potential upper-story residential pilot is one block north at the corner of Prospect (21351 Van Dyke), and across from the lot at 21234 Van Dyke is also called out as a redevelopment opportunity with historical integrity (this site could also serve the parking need if necessary). Particular care must be paid to the parking lot's design in order to make this happen, because the effect of an unscreened expanse of vehicles dampens walkability rather than enhances it. There are other challenges, too, including the existing auto-oriented uses on either side of Westminster Avenue which interrupt the visual interest. If the new Feed Store / Little Door entertainment district is successful enough to face these problems, it would be a welcome challenge.

## Lincoln Youth Zone

Two blocks east of the Van Dyke Avenue Corridor is a K-12 educational campus, accessible to the corridor by any one of eight residential streets, that includes Lincoln Elementary, Middle, and High Schools along with the Van Dyke Public School Library and a series of athletic fields. One could imagine a little node on Van Dyke at the end of one of those streets that is designed for students to congregate in an age-appropriate way, with opportunities for semi-structured recreation and for young people who are just beginning to experience independent mobility to purchase snacks and necessities. This would be a real amenity signaling the City's interest in providing a public realm that actively supports young families.

This vision can hardly even be contemplated until the character of Van Dyke Avenue has already changed significantly. The corridor must be much more physically protective of its non-motorized users before a parent would consider its unsupervised use, especially considering that the building is on the opposite side of the street from where children would be approaching.

But the corridor stretch in question is currently surrounded by plenty of opportunity to implement change. There is land next to the former library building that could host outdoor recreation. To the south of the library, on the other side of Studebaker Avenue, is a block with two redevelopment opportunities: a building identified in the historic assessment as a good candidate for a residential project (21805 Van Dyke), and a large vacant lot that could host a mixed use development with the aforementioned commercial use.

Across Van Dyke Avenue, this entire block is a vacant redevelopment opportunity that could host at least dozens of attached residential units. An infusion of attached housing here—much-needed everywhere—could provide an opportunity to share the costs of the public investments in recreation and non-motorized safety with the private sector. In this case, the character of this area could shift surprisingly suddenly. But even if it does not, the proximity of the educational campus to the corridor, and thus the opportunity, will persist, and a steady focus on it will allow for incremental progress.





Lincoln Middle School, a part of the educational campus that can benefit from a proposed Lincoln Youth Zone.



# 5

# IMPLEMENTATION STRATEGY

Implementing the design and land use recommendations identified in this report will create a more unified, safe, and aesthetically appealing corridor while supporting the economic viability of businesses along Van Dyke Avenue. This implementation strategy is divided into Economic Development, Traffic & Transportation, and Pedestrian Amenities & Beautification.

## ZONING RECOMMENDATIONS

### Historic Preservation Strategies & Recommendations

"To generate exuberant diversity in a city's streets and districts four conditions are indispensable:

1. The district, and indeed as many of its internal parts as possible, must serve more than one primary function; preferably more than two.
2. Most blocks must be short; that is, streets and opportunities to turn corners must be frequent.
3. The district must mingle buildings that vary in age and condition, including a good proportion of old ones so that they vary in the economic yield they must produce. This mingling must be fairly close-grained.
4. There must be a sufficiently dense concentration of people, for whatever purposes they may be there..."

"Jane Jacobs, *The Death and Life of Great American Cities*"

When envisioning a vibrant, sustainable, and collaborative future for the Van Dyke Corridor - the heart of South Warren - there are three concepts that Preservation Forward recommends that intersect historic preservation and planning initiatives:

#### *Community-Focused Collaboration*

Community-focused collaboration to encourage community members to consider the Van Dyke Corridor as the heart and the surrounding residential neighborhoods as the soul. These two unique

environments are a symbiotic relationship. The community members that reside in the neighborhoods to support the Van Dyke Corridor. The Van Dyke Corridor should have activated spaces that beg for community members to patronize them. These efforts will not happen in a vacuum. Being community-focused illustrates that Van Dyke Avenue is the center of the redefined Van Dyke Corridor amenities, ideally, locally owned businesses, nurturing creative entrepreneurs, and welcoming the arts by investing locally in the community members that make the Van Dyke Corridor uniquely south Warren.

An excellent location to consider a community-focused effort is the Maybelle Burnette Library. An architectural treasure along the Van Dyke Corridor, and if currently underutilized, would serve as an excellent candidate for a youth center to create a place for youth who reside along the Van Dyke Corridor to join peer groups, socialize, study, and connect in a safe and welcoming space.

#### *Redevelopment-Driven Determination*

The Van Dyke Corridor is the ideal place to execute redevelopment-driven determination that will require grit and hopeful optimism. The corridor boasts a backdrop of historic and older buildings - though some may require a little extra care than others. This may inspire community members to try their entrepreneurial spirit and take a chance on an empty storefront. The corridor has a number of vacant buildings that can be identified as key opportunities for small-business startups that are favorable to encouraging further reinvestment like artist incubators, coffee shops, music stores, and more.

Approximately 9% of the commercial properties along the corridor are currently vacant. The Van Dyke Corridor sees 18,291 visitors that travel the corridor on their daily commute in and out of south Warren. Opportunities abound to reactivate blighted, commercial spaces with a fresh idea that's locally-connected to south Warren. There are both architectural eyesores that beg to be revitalized into architectural eye candy. Consider independent niche and needed retail shops, amenities like a small, local grocer that supports neighboring resident's needs, unique dining experiences tailored to the tastes of south Warren, and an urban atmosphere that's enhanced by small startups with residential units at the second-story that could draw people to the corridor. As it is now, Van Dyke Avenue is walkable. However, to cultivate a safer streetscape appropriate

planning measures could be taken to by installing pedestrian and ADA-friendly paving, lighting, street trees, places for community members to rest, on-street parking spaces, etc. The optics of south Warren would be visualized as vibrant and welcoming with a completely new lens. This is redevelopment-driven determination.

The corridor supports mixed-use developments that include residences as well as commercial and office space. It's recommended that the unique sites pilot a single-story, commercial redevelopment within three, vacant storefronts at 23150, 23154, 23158 Van Dyke Avenue. Also, there are two, two-story, mixed-use development opportunities at 21351 and 21805 Van Dyke Avenue that could be catalysts for further redevelopment along the Van Dyke Corridor. There's a shortage of residential units along the corridor and the upper floor of these two, existing buildings are ripe for redevelopment.

### *Planning and Preservation-Focused*

Considering the important intersection of historic preservation and urban planning is a two-pronged approach that should be instrumental when exploring creative ways to revitalize the Van Dyke Corridor. These two disciplines are a natural match when paired together as tools to invest in community, sustainability, enhancement in the quality of life and in the built environment. Historic preservation lends to the appreciation of historic properties and recognition of their importance. Smart planning ordinances that are favorable to historic preservation enable commercial redevelopment and placemaking that equals a vibrant place in the long-term.

Older and historic buildings to continue to tell the story of our past for future generations to enjoy, and drive the idea of "placekeeping," keeping a place as historic as possible so that the community identifies and easily connects to their place. Planning for the future while considering the past is valuable when confronting vacant buildings. A renewed focus toward adapting these buildings to preserve the architecture, while incrementally filling them businesses that fit the market are simple, short-term projects can build momentum for larger revitalization efforts.

Moving forward within the Van Dyke Corridor includes a cultural shift in the existing mindsets. The more the Van Dyke Corridor can be envisioned as a place to live, work, learn, and enjoy, the more likely it will move toward it. It is essential to continue to think deeply and critically

about the future of historic preservation in south Warren—what we must do and where we need to go to keep moving forward.

## DESIGN IMPLEMENTATION

The scale of the proposed enhancements warrants a strategic, phased approach that can be adjusted to the needs and budgetary limits of the Warren Downtown Development Authority and the City of Warren. Funding for the Van Dyke Avenue Corridor enhancements will come from a variety of sources, including local capital improvement funds, general fund allocations, tax increment financing through the DDA, and state and federal funding programs.

Below is a description of the Implementation Focus Areas created for the Van Dyke Avenue Corridor as well as an explanation of a projected timeline for the proposed improvements. Table 5-1 identifies phasing possibilities for the implementation of the improvements. The table breaks down a conceptual budget for the options presented.

The implementation projects are listed in this table as holistic projects for the full length of the described corridors, however opportunities for phased implementation exist based upon future community priorities and funding opportunities.

### Phasing & Cost Opinions

#### *Implementation Focus Areas*

- » Traffic & Transportation (T) - Implementation areas focused on the physical improvements within the roadway.
- » Pedestrian Amenities & Beautification (P) – Implementation areas that improve the pedestrian zone and beautify the streetscape.

#### *Implementation Timeline*

- » Immediate (1-2 years) Projects that usually require the effectuation of a zoning amendment, specific study, or new local legislation
- » Short Term (3-4 Years) – Projects that require local capital improvement funding, and the procurement of private or state and federal funding
- » Long Term (Greater than 5 Years) – Projects that require a higher degree of coordination and the procurement of several funding sources

## Financing

Implementation projects of the scale and magnitude of the Van Dyke Avenue Corridor often require multiple project partners and funding sources. Often, funding programs are focused on priorities and goals that may only fund portions or specific elements within the overall Van Dyke Avenue projects. All funding sources and programs should be reviewed for complimentary requirements and opportunities to leverage local match dollars for multiple funding sources. Below is a select list of potential funding programs that may be applicable to the Van Dyke Avenue project:

- » American Rescue Plan Act Funding (various sources)
- » DTE Foundation Grants (Community Transformation, Economic Progress, Environment)
- » FHWA & MDOT Congestion Mitigation and Air Quality Improvement Program
- » MDNR Natural Resources Trust Fund Grant
- » MDNR Recreation Passport Grant
- » MDNR Urban and Community Forestry Grants
- » MDOT & SEMCOG Transportation Alternatives Program

**Table 5-1: Van Dyke Corridor Design Implementation Action Plan**

Van Dyke Corridor Design Implementation Action Plan	
T1 & P1 Van Dyke Ave - Eight Mile to Stephens Rd (approx. 1.5 miles)	
<b>Responsible Parties</b>	City of Warren
<b>Timeline</b>	Immediate Term
<b>Proposed Work</b>	<b>Estimated Cost</b>
<ul style="list-style-type: none"> <li>» Conduct Multi-Modal Transportation Impact Study</li> </ul>	\$60,000-\$80,000
T1 & P1 Van Dyke Ave - Eight Mile to Stephens (approx. 1.5 miles)	
<b>Responsible Parties</b>	City of Warren, TIFA, MDOT
<b>Timeline</b>	Short Term
<b>Proposed Work</b>	<b>Estimated Cost</b>
<ul style="list-style-type: none"> <li>» Remove and replace dead/dying street trees</li> <li>» Enhance pedestrian crosswalks (high visibility)</li> <li>» Add mid-block crossings with RRFB signals</li> <li>» Add protection pylons to existing bike lanes</li> <li>» Add bus stop amenities (concrete pads, benches, trash receptacles, shelters, etc.)</li> <li>» Minor sidewalk replacement (20%)</li> </ul>	\$3,000,000 - \$3,500,000

## Van Dyke Corridor Design Implementation Action Plan

T2 & P2 Van Dyke Ave - Eight Mile Rd to Stephens (approx. 1.5 miles)

<b>Responsible Parties</b>	City of Warren, TIFA, MDOT
<b>Timeline</b>	Long Term
<b>Proposed Work</b>	<b>Estimated Cost</b>
<ul style="list-style-type: none"> <li>» Add additional street and pedestrian lighting</li> <li>» Replace approximately 50% of concrete sidewalks based on condition/need</li> <li>» Remove redundant drive approaches</li> <li>» Add curb island protection to bike lanes</li> <li>» Add planted median islands</li> <li>» Add landscape screening for parking areas</li> <li>» Add signage, wayfinding, &amp; branding</li> </ul>	<p>\$12,000,000 - \$14,000,000</p>

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>» MDOT State Infrastructure Bank</li> <li>» MEDC Michigan Main Street Community Program</li> <li>» MEDC Public Spaces Community Places Program</li> <li>» Michigan Community Development Block Grant Programs</li> <li>» Michigan State Infrastructure Bank Loan Program</li> <li>» Michigan State Revolving Fund</li> <li>» Michigan State Non-Motorized Grants</li> <li>» Michigan Transportation Economic Development Fund</li> </ul> | <ul style="list-style-type: none"> <li>» NPS &amp; MDNR Land and Water Conservation Fund Grant</li> <li>» Public/Private Partnership Opportunities</li> <li>» Safe Routes to School Program</li> <li>» TMA Surface Transportation Block Grant Program</li> <li>» Transportation Alternatives Program (TAP)</li> <li>» USDOT Reconnecting Communities Pilot Program</li> <li>» Community Foundation for Southeast Michigan</li> <li>» Warren DDA (Future Funding)</li> </ul> |
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# APPENDIX

- Appendix A: Historic Field Assessment
- Appendix B: National Register Criteria for Evaluation
- Appendix C: National Park Service Preservation Briefs
- Appendix D: Secretary of the Interior's Standards for the Treatment of Historic Properties
- Appendix E: Michigan SHPO Architectural Properties Identification Form
- Appendix F: Historic Preservation Bibliography
- Appendix G: Van Dyke Avenue Safety Countermeasures
- Appendix H: Analysis Maps



## Historic Field Assessment

20958 Van Dyke Avenue



This one-story building at 20958 Van Dyke Avenue is located in an area that includes commercial and is bounded to the west by residential development. The building has a rectangular plan and is constructed of brick with a poured concrete foundation. The front entry is flanked by a large storefront window that is divided into three, separate panes by metal muntins. A similar window is repeated on the north elevation of the building. A terra cotta coping spans the perimeter of the roof.

Criteria	Assessment
Name	Kim's Elevation School of Cosmetology
Year Built	1953
Property Type	Commercial
Architect / Builder	Unknown
Plan	Rectangular
Roof Form	Flat
Roof Material	Membrane/Rolled
Walls	Brick
Other Materials	N/A
Historic Use	Commerce/Trade
Current Use	Commerce/Trade
Potential Areas of Significance	Commerce
Integrity	Location, Design, Setting, Materials, Workmanship, Feeling, Association
Architectural Classification	Post War / 20th century Commercial

21015 Van Dyke Avenue



This one-story building located at 21015 Van Dyke Avenue is locally-designated as the Base Line Feed Store. Thank you to the Warren Historical and Genealogical Society for this historical recordation of the property that reads, "The abstract deed for this property dates back to 1833 and the current building was constructed in 1877. Joseph Verheye bought the building in 1939 and started the "Base Line Feed Store" with one bag of corn. Verheye introduced the first Purina Pigeon Chow to the State of Michigan in 1943." Both buildings are rectangular in shape with the 1877 constructed building boasts an angled entry that is flanked by one, large storefront window. The 1939 constructed addition boasts a central entry flanked by four, storefront windows. The 1877 constructed building boasts a stepped parapet and unique brick coursing across the cornice and signboard locations. The 1939 addition has a similar stepped parapet along the facade and both buildings appear to retain their original shape, form, mass, scale, with some slight alteration of materials as when it was originally constructed. Windows have been covered over and the entirety of both buildings have had their exterior building materials painted.

Criteria	Assessment
Name	Base Line Feed Store
Year Built	1877, 1939
Property Type	Commercial
Architect / Builder	Unknown
Plan	L-shaped
Roof Form	Flat
Roof Material	Membrane/Rolled
Walls	Brick and Wood
Other Materials	N/A
Historic Use	Commerce/Trade
Current Use	Vacant
Potential Areas of Significance	Commerce
Integrity	Location, Design, Setting, Materials, Workmanship, Feeling, Association
Architectural Classification	Late 19th century / 20th century commercial

21227 Van Dyke Avenue



This 20th century, one-story, brick and concrete block commercial building has a central entrance with a transom window and is flanked by two, storefront windows that are divided by a center muntin. A stone beltcourse spans the center of the building across the signboard area. Stone sills support the storefront windows. Terra cotta coping is visible across the perimeter of the building.

Criteria	Assessment
Name	N/A
Year Built	1950
Property Type	Commercial
Architect / Builder	Unknown
Plan	Rectangular
Roof Form	Flat
Roof Material	Membrane/Rolled
Walls	Concrete Block and Brick (vener)
Other Materials	N/A
Historic Use	Commerce/Trade
Current Use	Vacant
Potential Areas of Significance	Commerce
Integrity	Location, Design, Setting, Materials, Workmanship, Feeling, Association
Architectural Classification	20th century commercial

21234 Van Dyke Avenue



This 20th century, one-story, brick and concrete block commercial building has an aluminum entry door with a transom window and is flanked by seven, vertical, storefront windows. Stone sills support the storefront windows. Terra cotta coping is visible across the perimeter of the building.

Criteria	Assessment
Name	N/A
Year Built	1963
Property Type	Commercial
Architect / Builder	Unknown
Plan	Rectangular
Roof Form	Flat
Roof Material	Membrane/Rolled
Walls	Brick and concrete block
Other Materials	Wood paneling
Historic Use	Commerce/Trade
Current Use	Vacant
Potential Areas of Significance	Commerce
Integrity	Location, Design, Setting, Materials, Workmanship, Feeling, Association
Architectural Classification	20th century commercial

21351 Van Dyke Avenue



This 20th century, two-story, commercial building was constructed in 1950. The brick and concrete block building has a central, double-door entrance with two doors that access the first floor, commercial spaces. The storefront, arched windows appear to have been altered from their original fenestration as the original windows may have been larger at one point in time. Brick corbeling accent the entryway and a brick belt course spans the length of the storefront at the center section of the facade. Four, slider-style windows are visible at the upper story and boast stone lintels and sills. Brick quoining accents the corner of the facade at the side elevations. Terra cotta coping spans the perimeter of the building with a stepped parapet along the sides of the building.

Criteria	Assessment
Name	Nono's Pizza
Year Built	1950
Property Type	Mixed-use / Commercial
Architect / Builder	Unknown
Plan	Rectangular
Roof Form	Flat
Roof Material	Membrane/Rolled
Walls	Concrete block/brick
Other Materials	N/A
Historic Use	Commerce/Trade
Current Use	Restaurant on first floor commercial space
Potential Areas of Significance	Commerce
Integrity	Location, Design, Setting, Feeling, Association
Architectural Classification	20th century commercial

21747 Van Dyke Avenue



This 20th century, one-story, brick and concrete block, commercial building was constructed in 1950. The building boasts two entrances, one at the center of the facade and one at the corner of the facade and side elevation that’s an angled entry. The storefront has been altered over time with the storefront windows being covered in vinyl siding and glass blocks installed that span the facade. The upper area of the facade has decorative brick coursing and the parapet of the building has five crenellations. Terra cotta coping spans the perimeter of the building.

Criteria	Assessment
Name	All Star Books
Year Built	1950
Property Type	Commercial
Architect / Builder	Unknown
Plan	Rectangular
Roof Form	Flat
Roof Material	Membrane/Rolled
Walls	Brick and Concrete Block
Other Materials	Vinyl siding
Historic Use	Commerce/Trade
Current Use	Commercial
Potential Areas of Significance	Commerce
Integrity	Location, Design, Setting, Feeling, Association
Architectural Classification	20th century commercial

21805 Van Dyke Avenue



This 20th century, two-story, brick masonry building was constructed in 1950 and has been altered with a stone veneer which surrounds the commercial storefront. A central entryway leads to the first floor, commercial space. The storefront windows have been altered from their original fenestration and have tinted glass. The north elevation has two, fixed windows at the first floor and a side rear entrance with an awning. The upper story shows a slider-style, 1:1 pattern fenestration across the facade and side elevation; all windows have stone lintels and sills. A second entry exists at the storefront with access to the upper floor. A stone belt course spans the center of the building across the facade and side elevation. Terra cotta coping extends across the perimeter of the building.

Criteria	Assessment
Name	N/A
Year Built	1950
Property Type	Commercial
Architect / Builder	Unknown
Plan	Rectangular
Roof Form	Flat
Roof Material	Membrane/Rolled
Walls	Brick, concrete block, and stone
Other Materials	N/A
Historic Use	Commerce/Trade
Current Use	Commercial
Potential Areas of Significance	Commerce
Integrity	Location, Setting, Feeling, Association
Architectural Classification	20th century commercial

22005 Van Dyke Avenue



This one-story, municipal building was constructed in 1966 and is composed of brick masonry and concrete block with a rectilinear design and decorative accents that reflect its mid-century modern style of construction. A low-hanging, aluminum, heavily-horizontal eave overhangs across the perimeter of the building. Diagonal, decorative brick coursing is visible across the facade and side elevations. A central entrance that is flanked by a large, aluminum window system serves as the front entrance. Vertical, aluminum windows span the facade and side elevations and at the northeast and southeast corners are windows that serve as part of the exterior wall system. A concrete slab extends outward from the building creating another element of horizontality and following the form and profile of the eave overhang. This building is in excellent condition.

Criteria	Assessment
Name	Maybelle Burnette Library
Year Built	1966
Property Type	Municipal
Architect / Builder	Unknown
Plan	Rectangular
Roof Form	Flat
Roof Material	Membrane/Rolled
Walls	Brick and concrete block
Other Materials	Glass
Historic Use	Education
Current Use	Vacant/Unknown
Potential Areas of Significance	Commerce
Integrity	Location, Design, Setting, Materials, Workmanship, Feeling, Association
Architectural Classification	20th Century Municipal / Mid-Century Modern



22555 Van Dyke Avenue



This 20th century, one-story, brick and concrete block, commercial building was constructed in 1969. A recessed entryway is located at the center of the facade where it's flanked by two, storefront windows. One storefront window is constructed of glass block. The other storefront window is a fixed window with nine lights divided by muntins in a horizontal manner. An asphalt pent roof hangs over the glass block storefront window. Two side entrances are located at the south elevation. The building appears to have been altered from its original construction with the installation of the glass block. Terra cotta coping spans the perimeter of the building.

Criteria	Assessment
Name	Gingles Barber Shop
Year Built	1969
Property Type	Commercial
Architect / Builder	Unknown
Plan	Rectangular
Roof Form	Flat
Roof Material	Membrane/Rolled
Walls	Brick and concrete block
Other Materials	Glass block
Historic Use	Commerce/Trade
Current Use	Commercial
Potential Areas of Significance	Commerce
Integrity	Location, Setting, Feeling, Association
Architectural Classification	20th century commercial

22715 Van Dyke Avenue



This 20th century, one-story, brick and concrete block commercial building has two entrances—one entrance that is flush with the facade and the other that faces the south elevation (formerly was an angled entrance). An aluminum, storefront window system spans the length of the facade with part of the windows covered in painted panels. Terra cotta coping is visible across the perimeter of the building.

Criteria	Assessment
Name	Nik Necessities Shop
Year Built	1963
Property Type	Commercial
Architect / Builder	Unknown
Plan	Rectangular
Roof Form	Flat
Roof Material	Membrane/Rolled
Walls	Brick and concrete block
Other Materials	Glass
Historic Use	Commerce/Trade
Current Use	Commercial
Potential Areas of Significance	Commerce
Integrity	Location, Design, Setting, Materials, Workmanship, Feeling, Association
Architectural Classification	20th century commercial

22720 Van Dyke Avenue



This 20th century, one-story, brick and concrete block commercial building appears to have always been a utilitarian structure for servicing transportation / auto-related needs as visible by its design, form, and openings. This property looks closely related to the property located at 22740-22760 Van Dyke Avenue (though this property is a decade later in construction). The building boasts a central entryway that is flanked to the south by a large storefront window that is divided by muntins. The entryway is flanked to the north by a large bay (garage) door. The storefront has a stone bulkhead and a stone lintel with a metal awning that spans the length of the storefront and is accented with gooseneck lights. Near the cornice of the facade, an enameled brick course accents the upper portion of the facade. The parapet has a crenelated design with an enameled veneer coping atop the stepped parapet that extends the perimeter of the building. A historic sign hangs vertically from the facade.

Criteria	Assessment
Name	Carl's Safety Service
Year Built	1950
Property Type	Commercial
Architect / Builder	Unknown
Plan	Rectangular
Roof Form	Flat
Roof Material	Membrane/Rolled
Walls	Brick and concrete block
Other Materials	Enameled brick
Historic Use	Commerce/Trade
Current Use	Commercial
Potential Areas of Significance	Commerce
Integrity	Location, Design, Setting, Materials, Workmanship, Feeling, Association
Architectural Classification	20th century commercial

22740-22760 Van Dyke Avenue



These 20th century, brick and concrete block commercial buildings were both constructed in 1950 and have similar design styles that are visible within the storefronts of each structure. Both properties, located at 22740 and 22760 Van Dyke Avenue, boast cream city brick on their exteriors. The two-story building located at 22740 Van Dyke has a similar storefront system and stylistic design as 22720 Van Dyke Avenue. A recessed, central entryway is flanked by two, large storefront windows that are divided by muntins and a stone bulkhead supports the storefront at the base. The storefront has a banding of aluminum trim that spans the top and the storefront is trimmed in brick. A doorway at the street level leads to the upper story. The upper story has five, symmetrically placed windows across the upper portion of the facade with an enameled brick belt course defining the upper section of the building. This belt course extends to the side elevations of the building. The upper story of the facade also boasts enameled cream city brick that differs from the basic brick that accents the storefront. Gooseneck lights hang atop the storefront near the upper story windows. A large, vertical sign hangs from the upper portion of the building. This property looks closely related to the property located at 22740-22760 Van Dyke Avenue (though this property is a decade later in construction). The stepped parapet has an enameled veneer and stone coping that extends the perimeter of the building. The property located at 22760 Van Dyke has many features similar to both of the properties located at 22720 and 22740 Van Dyke; however, this building boasts an angled entryway and steeply pitched gables across the mansard roof. This building boasts a unique roofline and material that is unlike any other building along the Van Dyke Corridor. A mansard roof constructed of slate tile with three front, gable decorative features infilled with mosaic. The brickwork on the mansard roof (above the storefront) is a diamond-shaped pattern with timber-framed, truss-like designs within the brick coursing. The north elevation of this building has a small storefront window and what appears to be storefront windows that have been bricked in, but also a continuous brick wall that has been constructed in front of a residence –similar to the property located at 23158 Van Dyke Avenue. This block of buildings (having

## Appendix A: Historic Field Assessment

similar stylistic details and architectural features) likely was constructed at a similar time frame in 1940 with the property at 22720 Van Dyke Avenue constructed in 1950. A unique collection of buildings along this section of the Van Dyke Corridor.

Criteria	Assessment
Name	MI Maintenance Supply
Year Built	1940
Property Type	Commercial
Architect / Builder	Unknown
Plan	Rectangular and L-shaped
Roof Form	Flat
Roof Material	Membrane/Rolled
Walls	Brick and concrete block
Other Materials	Enameled brick
Historic Use	Commerce/Trade
Current Use	Commercial
Potential Areas of Significance	Commerce
Integrity	Location, Design, Setting, Materials, Workmanship, Feeling, Association
Architectural Classification	20th century commercial

22860 Van Dyke Avenue and 22866 Van Dyke Avenue



This 20th century, one-story, brick and concrete block commercial building was constructed in 1950 and has two entrances—one center entrance that is flush with the facade at 22866 Van Dyke Avenue and the other that is an angled entrance at 22860 Van Dyke Avenue. Both entrances are flanked by aluminum, storefront window systems. The storefront windows have a large metal awning that hangs over the storefronts at the signboard area. The brick veneer that covers the building at the facade is a very thin, mid-century style brick in a variegated color scheme. Terra cotta coping is visible across the perimeter of the building.

Criteria	Assessment
Name	A-1 Family Barbers, Ed and Lil’s Flowers,
Year Built	1950
Property Type	Commercial
Architect / Builder	Unknown
Plan	Rectangular
Roof Form	Flat
Roof Material	Membrane/Rolled
Walls	Brick and concrete block
Other Materials	N/A
Historic Use	Commerce/Trade
Current Use	Commercial
Potential Areas of Significance	Commerce
Integrity	Location, Design, Setting, Materials, Workmanship, Feeling, Association
Architectural Classification	20th century commercial

22865 Van Dyke Avenue



This 20th century, one-story, brick and concrete block commercial building was constructed in 1950 and has an angled entrance at the northeast corner. An aluminum, storefront window system spans the length of the facade and a plastic awning hangs across the entrance and east elevation (facade) at the signboard area. Glass block windows align the side (north elevation). Terra cotta coping is visible across the perimeter of the building.

Criteria	Assessment
Name	Zella Appliances
Year Built	1950
Property Type	Commercial
Architect / Builder	Unknown
Plan	Rectangular
Roof Form	Flat
Roof Material	Membrane/Rolled
Walls	Brick and concrete block
Other Materials	N/A
Historic Use	Commerce/Trade
Current Use	Commercial
Potential Areas of Significance	Commerce
Integrity	Location, Setting, Materials, Feeling, Association
Architectural Classification	20th century commercial

23150 Van Dyke Avenue



This 20th century, one-story, brick and concrete block commercial building was constructed in 1950. The building has been altered from its original construction with a modern, angled storefront and entrance at the southwest corner of the facade. Also, metal panels have covered the original building materials across the facade. Mirrored glass gives the storefront a more modern appearance. Terra cotta coping is visible across the perimeter of the building.

Criteria	Assessment
Name	N/A
Year Built	1950
Property Type	Commercial
Architect / Builder	Unknown
Plan	Rectangular
Roof Form	Flat
Roof Material	Membrane/Rolled
Walls	Brick and concrete block
Other Materials	N/A
Historic Use	Commerce/Trade
Current Use	Commercial
Potential Areas of Significance	Commerce
Integrity	Location, Setting, Design, Feeling, Association
Architectural Classification	20th century commercial



23154 Van Dyke Avenue and 23158 Van Dyke Avenue (23158 left, 23154 right)



This 20th century, one-story, brick and concrete block commercial building was constructed in 1950. The building boasts two storefronts 23154 and 23158 Van Dyke Avenue which have both been altered extensively. The storefront at 23154 has been sheathed in wood paneling with an entrance at the southwest corner. The entrance is flanked by a large storefront window with a divided muntin that separates two lights. The storefront at 23158 has a central, slightly recessed entrance. Storefront windows have been bricked over and horizontal, fixed windows accented by glass blocks that flank the entryway. The upper portion of the facade has remained intact and retains its historic integrity. Decorative stonework has been inlaid in a pattern just below the cornice and a row of soldier brick courses spans the upper portion of the facade. The cornice is crenelated across the parapet and has a band of stone at the coping. The rear of the building (east elevation) at 23158 abuts a residential home with a gambrel roof that appears to date to the early 1900s. This building was constructed on a small section of greenspace or yard of the residence when Post War commercial development occurred along Van Dyke Avenue. This is a very unique attribute of this one-story, commercial building.

Criteria	Assessment
Name	N/A
Year Built	1950
Property Type	Commercial
Architect / Builder	Unknown
Plan	Rectangular
Roof Form	Flat
Roof Material	Membrane/Rolled
Walls	Brick and concrete block
Other Materials	Wood
Historic Use	Commerce/Trade
Current Use	Commercial
Potential Areas of Significance	Commerce
Integrity	Location, Setting, Materials, Feeling, Association, Design, Workmanship
Architectural Classification	20th century commercial

23326 Van Dyke Avenue



This 20th century, one-story, brick and concrete block commercial building was constructed in 1950. The building has a recessed, central entrance and is flanked by two, fixed, sidelight windows with a transom. Two, aluminum, storefront window systems support the center entrance of the building. The upper portion of the facade has a running bond brick coursing in a variegated color scheme. A plastic awning hangs across the entrance at the west elevation (facade) at the signboard area. Terra cotta coping is visible across the perimeter of the building along with a stepped parapet at the south elevation.

Criteria	Assessment
Name	Prop Shop Hobbies
Year Built	1950
Property Type	Commercial
Architect / Builder	Unknown
Plan	Rectangular
Roof Form	Flat
Roof Material	Membrane/Rolled
Walls	Brick and concrete block
Other Materials	N/A
Historic Use	Commerce/Trade
Current Use	Commercial
Potential Areas of Significance	Commerce
Integrity	Location, Setting, Materials, Feeling, Association, Workmanship, Design
Architectural Classification	20th century commercial

23537 Van Dyke Avenue



This 20th century, one-story, brick and concrete block commercial building appears to have always been a utilitarian structure for servicing transportation / auto-related needs as visible by its design, form, and openings. Constructed in 1950, the building boasts two doorways at the center of the facade. One doorway is flanked by a large, storefront window. The other doorway is flanked by a garage (bay) door that is constructed at a half-story higher than the other portions of the building. A large garage bay door is located at the northeast section of the facade. Gooseneck lighting hangs in the center of the upper portion of the facade. The north elevation has a garage bay door near the northwest section of the elevation. Three infilled windows are visible across the center of the elevation. Terra cotta coping extends the perimeter of the building.

Criteria	Assessment
Name	Stan's Exhaust and Tune Up
Year Built	1950
Property Type	Commercial
Architect / Builder	Unknown
Plan	Rectangular
Roof Form	Flat
Roof Material	Membrane/Rolled
Walls	Brick and concrete block
Other Materials	N/A
Historic Use	Commerce/Trade
Current Use	Commercial
Potential Areas of Significance	Commerce
Integrity	Location, Setting, Materials, Feeling, Association, Workmanship, Design
Architectural Classification	20th century commercial

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## II. THE NATIONAL REGISTER CRITERIA FOR EVALUATION

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### CRITERIA FOR EVALUATION:<sup>3</sup>

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
- B. That are associated with the lives of persons significant in our past; or
- C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- D. That have yielded, or may be likely to yield, information important in prehistory or history.

### CRITERIA CONSIDERATIONS:

Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties *will qualify* if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

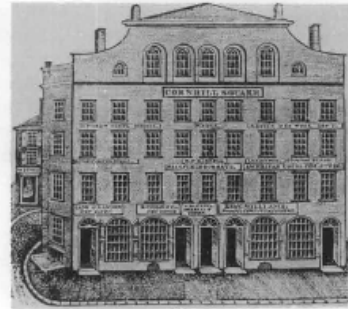
- a. A religious property deriving primary significance from architectural or artistic distinction or historical importance; or
- b. A building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or

- c. A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his or her productive life; or
- d. A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or
- e. A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or
- f. A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or
- g. A property achieving significance within the past 50 years if it is of exceptional importance.

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<sup>3</sup>The Criteria for Evaluation are found in the *Code of Federal Regulations, Title 36, Part 60*, and are reprinted here in full.

# 11 PRESERVATION BRIEFS



## Rehabilitating Historic Storefronts

H. Ward Jandl



U.S. Department of the Interior  
National Park Service  
Cultural Resources  
Heritage Preservation Services

The storefront is the most important architectural feature of many historic commercial buildings. It also plays a crucial role in a store's advertising and merchandising strategy to draw customers and increase business. Not surprisingly, then, the storefront has become the feature most commonly altered in a historic commercial building. In the process, these alterations may have completely changed or destroyed a building's distinguishing architectural features that make up its historic character.

As more and more people come to recognize and appreciate the architectural heritage of America's downtowns, however, a growing interest can be seen in preserving the historic character of commercial buildings. The sensitive rehabilitation of storefronts can result not only in increased business for the owner but can also provide evidence that downtown revitalization efforts are succeeding (see figure 1).

Once a decision is made to rehabilitate a historic commercial building, a series of complex decisions faces the owner, among them:

- if the original storefront has survived largely intact but is in a deteriorated condition, what repairs should be undertaken?
- if the storefront has been modernized at a later date, should the later alterations be kept or the building restored to its original appearance or an entirely new design chosen?
- if the building's original retail use is to be changed to office or residential, can the commercial appearance of the building be retained while accommodating the new use?

This Preservation Brief is intended to assist owners, architects, and planning officials in answering such questions about how to evaluate and preserve the character of historic storefronts. In so doing, it not only addresses the



Figure 1. Inappropriate storefront alterations over the years—metal cladding, oversized signs and canopies—have detracted from the character of this historic district in Van Buren, Arkansas. A carefully considered rehabilitation plan for Main Street, including the removal of poorly designed signs, false fronts and the selection of an appropriate exterior paint color palette, serves to enhance the visual environment and preserves the district's sense of time and place. Photo above: Bob Dunn; Drawing, David Fitts

basic design issues associated with storefront rehabilitation, but recommends preservation treatments as well. Finally, although the Brief focuses on storefront rehabilitation, it is important to review this specific work in the broader context of preserving and maintaining the overall structure. Money spent on storefront rehabilitation may be completely wasted if repair and maintenance problems on the rest of the building are neglected.

**Historical Overview**

Commercial establishments of the 18th and early 19th centuries were frequently located on the ground floor of buildings and, with their residentially scaled windows and doors, were often indistinguishable from surrounding houses. In some cases, however, large bay or oriel windows comprised of small panes of glass set the shops apart from their neighbors. Awnings of wood and canvas and signs over the sidewalk were other design features seen on some early commercial buildings. The ground floors of large commercial establishments, especially in the first decades of the 19th century, were distinguished by regularly spaced, heavy piers of stone or brick, infilled with paneled doors or small paned window sash. Entrances were an integral component of the facade, typically not given any particular prominence although sometimes wider than other openings.

The ready availability of architectural cast iron after the 1840's helped transform storefront design as architects and builders began to experiment using iron columns and lintels at the ground floor level. Simultaneous advances in the glass industry permitted manufacturing of large panes of glass at a reasonable cost. The combination of these two technical achievements led to the storefront as we know it today—large expanses of glass framed by thin structural elements. The advertisement of the merchant and his products in the building facade and display windows quickly became critical factors in the competitive commercial atmosphere of downtowns. In the grouping of these wide-windowed facades along major commercial streets, the image of America's cities and towns radically changed.

The first cast iron fronts were simple post-and-lintel construction with little decoration. As iron craftsmen became more adept and as more ornate architectural styles became popular, cast iron fronts were given Italianate, Venetian Gothic, and French Second Empire details. Cast iron storefronts could be selected directly from catalogs, which began to appear in the early 1850's. Standardized sills, columns, and lintels could be arranged to create fronts of all sizes, styles and configurations. In the 1870's sheet metal storefronts became popular; they were also sold in standardized sizes and configurations through manufacturers' catalogs (see figure 2).

The typical 19th century storefront consisted of single or double doors flanked by display windows (see figure 3). The entrance was frequently recessed, not only to protect the customer from inclement weather but to increase the amount of space in which to display merchandise. In some cases an additional side door provided access to the upper floors. Thin structural members of cast iron or wood, rather than masonry piers, usually framed the storefront. The windows themselves were raised off the ground by wood, cast iron or pressed metal panels or bulkheads; frequently, a transom or series of transoms (consisting of single or multiple panes of glass) were

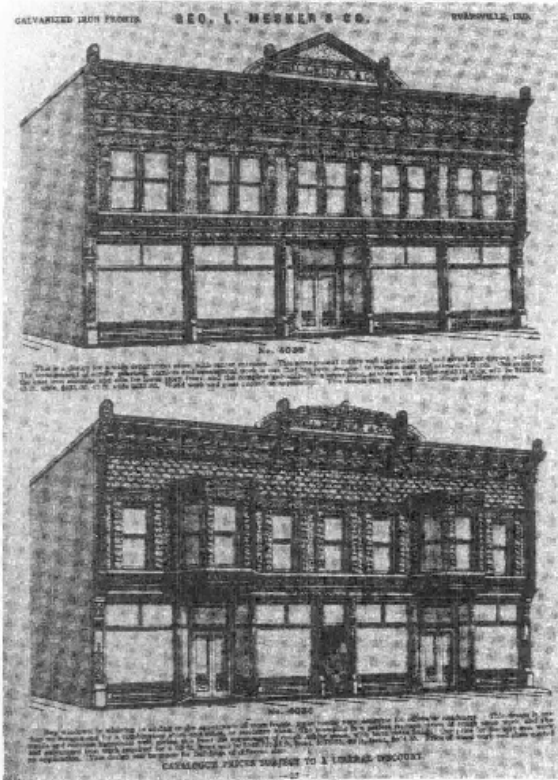


Figure 2. These 19th century galvanized iron storefronts could be purchased from George L. Mesker & Co. in Evansville, Indiana.

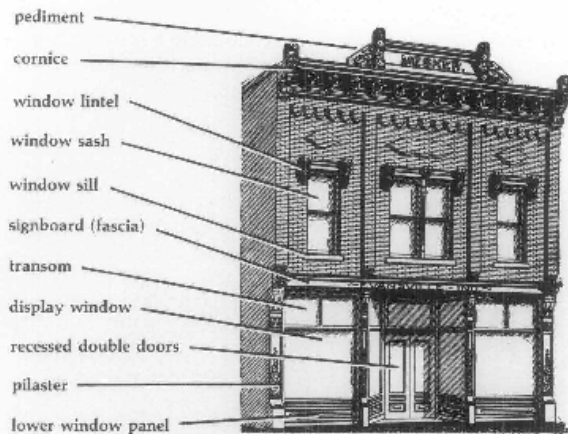


Figure 3. Become familiar with the architectural features typical of historic commercial buildings. A close look at a storefront's construction materials, features and relationship to the upper stories will help in determining how much of the original facade remains.

This particular storefront is No. 4016 in the George L. Mesker and Company catalog of 1905. One of Mesker's most popular designs, it featured cast-iron sills, columns and lintels, galvanized iron lintel and main cornice, window caps and pediment.

placed above each window and door. The signboard above the storefront (the fascia covering the structural beam) became a prominent part of the building. Canvas awnings, or in some cases tin or wooden canopies, often shaded storefronts of the late 19th century. Iron fronts were frequently put onto existing buildings as a way of giving them an up-to-date appearance. Except for expanding the display window area to the maximum extent possible and the increasing use of canvas awnings, few major technical innovations in storefront design can be detected from the 1850's through 1900.

The first decades of the 20th century saw the growing use of decorative transom lights (often using small prismatic glass panes) above display windows; in some cases, these transoms could be opened to permit air circulation into the store. Electric incandescent lights enabled storeowners to call attention to their entrance and display windows and permitted nighttime shopping. In the 1920's and 1930's a variety of new materials were introduced into the storefront, including aluminum and stainless steel framing elements, pigmented structural glass (in a wide variety of colors), tinted and mirrored glass, glass block and neon. A bewildering number of proprietary products also appeared during this period, many of which went into storefronts including Aklo, Vitrolux, Vitrolite, and Extrudalite. Highly colored and heavily patterned marble was a popular material for the more expensive storefronts of this period. Many experiments were made with recessed entries, floating display islands, and curved glass. The utilization of neon lighting further transformed store signs into elaborate flashing and blinking creations. During this period design elements were simplified and streamlined; transom and signboard were often combined. Signs utilized typefaces for the period, including such stylized lettering as "Broadway," "Fino" and "Monogram." Larger buildings of this period, such as department stores, sometimes had fixed metal canopies, with lighting and signs as an integral component of the fascia (see figure 4).

Because commercial architecture responds to a variety of factors—environmental, cultural, and economic, distinct regional variations in storefronts can be noted. Fixed metal canopies supported by guy wires, for example, were common in late 19th and early 20th century storefronts in southern states where it was advantageous to have shaded entrances all year long. Such a detail was less common in the northeast where moveable canvas awnings predominated. These awnings could be lowered in summer to keep buildings cooler and raised in winter when sunlight helps to heat the building.

### Evaluating the Storefront

The important key to a successful rehabilitation of a historic commercial building is planning and selecting treatments that are sensitive to the architectural character of the storefront. As a first step, it is therefore essential to identify and evaluate the existing storefront's construction materials; architectural features; and the relationship of those features to the upper stores (see figure 5). This evaluation will permit a better understanding of the storefront's role in, and significance to, the overall design of the building. A second and equally important step in planning the rehabilitation work is a careful examination of the storefront's physical conditions to determine the ex-

tent and nature of rehabilitation work needed (see figure 6). In most cases, this examination is best undertaken by a qualified professional.



Figure 4. This storefront in New York City designed by Raymond Loewy typifies the streamlined look of the 1930's. Added to an earlier building, the front utilizes glass, stainless steel and neon to make a modern statement. This is a good example of a later storefront which has acquired significance and should be retained in any rehabilitation.



Figure 5. In some cases, as in the storefront on the extreme left, it is a simple matter to determine original appearance by looking at neighboring storefronts. Removal of the board and batten fasciaboard, pent roof, and "colonial" style door, all of which could be undertaken at minimal cost, would restore the original proportions and lines of the building. Photo: Day Johnston

#### Guidelines for Rehabilitating Existing Historic Storefronts

1. Become familiar with the style of your building and the role of the storefront in the overall design. Don't "early up" a front. Avoid stock "lumberyard colonial" detailing such as coach lanterns, mansard overhangings, wood shakes, nonoperable shutters, and small paned windows except where they existed historically.
2. Preserve the storefront's character even though there is a new use on the interior. If less exposed window area is desirable, consider the use of interior blinds and insulating curtains rather than altering the existing historic fabric.
3. Avoid use of materials that were unavailable when the storefront was constructed; this includes vinyl and aluminum siding, anodized aluminum, mirrored or tinted glass, artificial stone, and brick veneer.
4. Choose paint colors based on the building's historical appearance. In general do not coat surfaces that have never been painted. For 19th century storefronts, contrasting colors may be appropriate, but avoid too many different colors on a single facade.



Figure 6. Storefronts of the 1940's, 50's, and 60's were frequently installed by attaching studs or a metal grid over an early front and applying new covering materials. If the existing storefront is a relatively recent addition with little or no architectural merit, begin by removing the covering materials in several places as was done here. If this preliminary investigation reveals evidence of an earlier front, such as this cast-iron column, carefully remove the later materials to assess the overall condition of the historic storefront. The black mastic visible on the lower masonry panels was used for installing pigmented structural glass. Some attachment methods for modern facings, such as mastic or metal lath, may have seriously damaged the original fabric of the building, and this must be taken into account in the rehabilitation process. Photo: Bob Dunn

The following questions should be taken into consideration in this two-part evaluation:

**Construction Materials, Features, and Design Relationships**

*Storefront's Construction Materials:* What are the construction materials? Wood? Metal? Brick or other masonry? A combination?

*Storefront's Architectural Features:* What are the various architectural features comprising the storefront and how are they arranged in relationship to each other?

- **Supporting Columns/Piers:**  
What do the columns or piers supporting the storefront look like? Are they heavy or light in appearance? Are they flush with the windows or do they protrude? Are they all structural elements or are some columns decorative?
- **Display Windows and Transoms:**  
Are the display windows and transoms single panes of glass or are they subdivided? Are they flush with the

facade or are they recessed? What is the proportion of area between the display windows and transom? Are there window openings in the base panels to allow natural light into the basement?

- **Entrances:**  
Are the entrances centered? Are they recessed? Is one entrance more prominent than the others? How is the primary retail entrance differentiated from other entrances? Is there evidence that new entrances have been added or have some been relocated? Are the doors original or are they later replacements?
- **Decorative Elements:**  
Are there any surviving decorative elements such as molded cornices, column capitals, fascia boards, brackets, signs, awnings or canopies? Is there a belt-course, cornice, or fascia board between the first and second floor? Are some elements older than others indicating changes over time?

*Storefront's Relationship to Upper Stories:* Is there a difference in materials between the storefront and upper stories? Were the storefront and floors above it created as an overall design or were they very different and unrelated to each other?

It is also worthwhile to study the neighboring commercial buildings and their distinctive characteristics to look for similarities (canopies, lighting, signs) as well as differences. This can help determine whether the storefront in question is significant and unique in its own right and/or whether it is significant as part of an overall commercial streetscape.

**Physical Condition**

*Mild Deterioration:* Do the surface materials need repair? Is paint flaking? Are metal components rusting? Do joints need recaulking where materials meet glass windows? Mild deterioration generally requires only maintenance level treatments.

*Moderate Deterioration:* Can rotted or rusted or broken sections of material be replaced with new material to match the old? Can solid material (such as Carrara glass) from a non-conspicuous location be used on the historic facade to repair damaged elements? Do stone or brick components need repointing? Is the storefront watertight with good flashing connections? Are there leaky gutters or air conditioner units which drip condensation on the storefront? Is caulking needed? Moderate deterioration generally requires patching or splicing of the existing elements with new pieces to match the deteriorated element.

*Severe Deterioration:* Have existing facing materials deteriorated beyond repair through vandalism, settlement, or water penetration? Is there a loss of structural integrity? Is the material rusted through, rotted, buckling, completely missing? Are structural lintels sagging? Are support columns settled or out of alignment? Severe deterioration generally requires replacement of deteriorated elements as part of the overall rehabilitation.

In evaluating whether the existing storefront is worthy of preservation, recognize that good design can exist in any period; a storefront added in 1930 *may* have greater architectural merit than what is replaced (see figure 4). In commercial historic districts, it is often the diversity of



styles and detailing that contribute to the character; removing a storefront dating from 1910 simply because other buildings in the district have been restored to their 1860's appearance may not be the best preservation approach. If the storefront design is a good example of its period and if it has gained significance over time, it should be retained as part of the historical evolution of the building (this architectural distinctiveness could also be an economic asset as it may attract attention to the building).

### Deciding a Course of Action

The evaluation of the storefront's architectural features and physical condition will help determine the best course of action in the actual rehabilitation work. The following recommendations, adapted from the Secretary of the Interior's "Standards for Rehabilitation" and the accompanying interpretive guidelines, are designed to ensure that the historic commercial character of the building is retained in the rehabilitation process.

*If the original or significant storefront exists, repair and retain the historic features using recommended treatments (see following sections on rehabilitating metal, wood and masonry storefronts as well as the guidelines for rehabilitating existing historic storefronts found on page 3 ).*

*If the original or significant storefront no longer exists or is too deteriorated to save, undertake a contemporary design which is compatible with the rest of the building in scale, design, materials, color and texture; or undertake an accurate restoration based on historical research and physical evidence (see section on "Replacement Storefronts").* Where an original or significant storefront no longer exists and no evidence exists to document its early appearance, it is generally preferable to undertake a contemporary design that retains the commercial "flavor" of the building. The new storefront design should not draw attention away from the historic building with its detailing but rather should respect the existing historic character of the overall building. A new design that copies traditional details or features from neighboring buildings or other structures of the period may give the building a historical appearance which blends in with its neighbors but which never, in fact, existed. For this reason, use of conjectural designs, even if based on similar buildings elsewhere in the neighborhood or the availability of different architectural elements from other buildings or structures, is generally not recommended.

### Rehabilitating Metal Storefronts

Rehabilitating metal storefronts can be a complex and time-consuming task. Before steps are taken to analyze or treat deteriorated storefronts, it is necessary to know which metal is involved, because each has unique properties and distinct preservation treatments. Storefronts were fabricated using a variety of metals, including cast iron, bronze, copper, tin, galvanized sheet iron, cast zinc, and stainless steel. Determining metallic composition can be a difficult process especially if components are encrusted with paint. Original architect's specifications (sometimes available from permit offices, town halls, or records of the original owner) can be important clues in this regard and should be checked if at all possible.

**Iron**—a magnetic, gray-white malleable metal, readily susceptible to oxidation. Cast iron, most commonly found in storefronts, is shaped by molds and can withstand great compressive loads. Rolled sheet iron, sometimes galvanized with zinc, also was used in storefront construction. Stainless steel began to appear in storefronts after 1930.

**Zinc**—a medium-hard, bluish-white metal, widely used as a protective coating for iron and steel. It is softer than iron and is nonmagnetic.

**Copper**—a nonmagnetic, corrosion-resistant, malleable metal, initially reddish-brown but when exposed to the atmosphere turns brown to black to green.

**Bronze and brass**—nonmagnetic, abrasive-resistant alloys combining copper with varying amounts of zinc, lead, or tin. These copper alloys, more commonly found in office buildings or large department stores, range in color from lemon yellow to golden brown to green depending on their composition and are well suited for casting (see figure 7).

**Aluminum**—a lightweight, nonmagnetic metal commonly found on storefronts dating from the 1920's and 30's. Its brightness and resistance to corrosion has made it a popular storefront material in the 20th century.



Figure 7. Part of a large office building constructed in Washington, D.C. in 1928, this finely detailed bronze storefront is typical of many constructed during this period. It should be noted that the original grilles, spandrel panel and window above are all intact. Photo: David W. Look, AIA

### Repair and Replacement of Metal

Simply because single components of a storefront need repair or replacement should not be justification for replacing an entire storefront. Deteriorated metal architectural elements can be repaired by a variety of means, although the nature of the repair will depend on the extent of the deterioration, the type of metal and its location, and the overall cost of such repairs. Patches can be used to mend, cover or fill a deteriorated area. Such patches should be a close match to the original material to prevent galvanic corrosion. Splicing—replacement of a small section with new material—should be undertaken on structural members only when temporary bracing has been constructed to carry the load. Reinforcing—or bracing the damaged element with additional new metal material—can relieve fatigue or overloading in some situations.

If metal components have deteriorated to a point where they have actually failed (or are missing), replacement is the only reasonable course of action. If the components are significant to the overall design of the storefront, they should be carefully removed and substituted with components that match the original in material, size and detailing (see figure 8).



Figure 8. When the Grand Opera House in Wilmington, Delaware, was rehabilitated, missing cast-iron columns were cast of aluminum to match the original; in this particular case, because these columns do not carry great loads, aluminum proved to be successful substitute. Photo: John G. Waite

Before going to the expense of reproducing the original, it may be useful to check salvage yards for compatible components. Missing parts of cast iron storefronts can be replaced by new cast iron members that are reproductions of the original. New wooden patterns, however, usually need to be made if the members are large. This procedure tends to be expensive (it is usually impossible to use existing iron components as patterns to cast large elements because cast iron shrinks 1/5 inch per foot as it cools). In some situations, less expensive substitute materials such as aluminum, wood, plastics, and fiberglass, painted to match the metal, can be used without compromising the architectural character of the resource.

### Cleaning and Painting

Cast iron storefronts are usually encrusted with layers of paint which need to be removed to restore crispness to the details. Where paint build-up and rust are not severe

problems, handscraping and wire-brushing are viable cleaning methods. While it is necessary to remove all rust before repainting, it is not necessary to remove all paint. For situations involving extensive paint build-up and corrosion, mechanical methods such as low-pressure gentle dry grit blasting (80-100 psi) can be effective and economical, providing a good surface for paint. Masonry and wood surfaces adjacent to the cleaning area, however, should be protected to avoid inadvertent damage from the blasting. It will be necessary to recaulk and putty the heads of screws and bolts after grit blasting to prevent moisture from entering the joints. Cleaned areas should be painted immediately after cleaning with a rust-inhibiting primer to prevent new corrosion. Before any cleaning is undertaken, local codes should be checked to ensure compliance with environmental safety requirements.

Storefronts utilizing softer metals (lead, tin), sheet metals (sheet copper), and plated metals (tin and terneplate) should not be cleaned mechanically (grit blasting) because their plating or finish can be easily abraded and damaged. It is usually preferable to clean these softer metals with a chemical (acid pickling or phosphate dipping) method. Once the surface of the metal has been cleaned of all corrosion, grease, and dirt, a rust-inhibiting primer coat should be applied. Finish coats especially formulated for metals, consisting of lacquers, varnishes, enamels or special coatings, can be applied once the primer has dried. Primer and finish coats should be selected for chemical compatibility with the particular metal in question.

Bronze storefronts, common to large commercial office buildings and major department stores of the 20th century, can be cleaned by a variety of methods; since all cleaning removes some surface metal and patina, it should be undertaken only with good reason (such as the need to remove encrusted salts, bird droppings or dirt). Excessive cleaning can remove the texture and finish of the metal. Since this patina can protect the bronze from further corrosion, it should be retained if possible. If it is desirable to remove the patina to restore the original surface of the bronze, several cleaning methods can be used: chemical compounds including rottenstone and oil, whitening and ammonia, or precipitated chalk and ammonia, can be rubbed onto bronze surfaces with a soft, clean cloth with little or no damage. A number of commercial cleaning companies successfully use a combination of 5% oxalic acid solution together with finely ground India pumice powder. Fine glass-bead blasting (or peening) and crushed walnut shell blasting also can be acceptable mechanical methods if carried out in controlled circumstances under low (80-100 psi) pressure. Care should be taken to protect any adjacent wood or masonry from the blasting.

The proper cleaning of metal storefronts should not be considered a “do-it-yourself” project. The nature and condition of the material should be assessed by a competent professional, and the work accomplished by a company specializing in such work.

### Rehabilitating Wooden Storefronts

The key to the successful rehabilitation of wooden storefronts is a careful evaluation of existing physical conditions. Moisture, vandalism, insect attack, and lack of maintenance can all contribute to the deterioration of wooden storefronts. Paint failure should not be mistaken-

ly interpreted as a sign that the wood is in poor condition and therefore irreparable. Wood is frequently in sound physical condition beneath unsightly paint. An ice pick or awl may be used to test wood for soundness—decayed wood that is jabbed will lift up in short irregular pieces; sound wood will separate in long fibrous splinters.

#### Repair and Replacement of Wood

Storefronts showing signs of physical deterioration can often be repaired using simple methods. Partially decayed wood can be patched, built up, chemically treated or consolidated and then painted to achieve a sound condition, good appearance, and greatly extended life.

To repair wood showing signs of rot, it is advisable to dry the wood; carefully apply a fungicide such as pentachlorophenol (a highly toxic substance) to all decayed areas; then treat with 2 or 3 applications of boiled linseed oil (24 hours between applications). Afterward, fill cracks and holes with putty; caulk the joints between the various wooden members; and finally prime and paint the surface.

Partially decayed wood may also be strengthened and stabilized by consolidation, using semi-rigid epoxies which saturate porous decayed wood and then harden. The consolidated wood can then be filled with a semi-rigid epoxy patching compound, sanded and painted. More information on epoxies can be found in the publication "Epoxies for Wood Repairs in Historic Buildings," cited in the bibliography.

Where components of wood storefronts are so badly deteriorated that they cannot be stabilized, it is possible to replace the deteriorated parts with new pieces (see figure 9). These techniques all require skill and some expense, but are recommended in cases where decorative elements, such as brackets or pilasters, are involved. In some cases, missing edges can be filled and rebuilt using wood putty or epoxy compounds. When the epoxy cures, it can be sanded smooth and painted to achieve a durable and waterproof repair.



Figure 9. Rather than replace an entire wooden storefront when there is only localized deterioration, a new wooden component can be pieced-in, as seen here in this column base. The new wood will need to be given primer and top coats of a high quality exterior paint—either an oil-base or latex system. Also wood that is flaking and peeling should be scraped and hand-sanded prior to repainting. Photo: H. Ward Jandl

#### Repainting of Wood

Wooden storefronts were historically painted to deter the harmful effects of weathering (moisture, ultraviolet rays from the sun, wind, etc.) as well as to define and accent architectural features. Repainting exterior woodwork is thus an inexpensive way to provide continued protection from weathering and to give a fresh appearance to the storefront.

Before repainting, however, a careful inspection of all painted wood surfaces needs to be conducted in order to determine the extent of surface preparation necessary, that is, whether the existing layers of paint have deteriorated to the point that they will need to be partially or totally removed prior to applying the new paint.

As a general rule, removing paint from historic exterior woodwork should be avoided unless absolutely essential. Once conditions warranting removal have been identified, however, paint can be removed to the next sound layer using the gentlest method possible, then the woodwork repainted. For example, such conditions as mildewing, excessive chalking, or staining (from the oxidation of rusting nails or metal anchorage devices) generally require only thorough surface cleaning prior to repainting. Intercoat peeling, solvent blistering, and wrinkling require removal of the affected layer using mild abrasive methods such as hand scraping and sanding. In all of these cases of limited paint deterioration, after proper surface preparation the exterior woodwork may be given one or more coats of a high quality exterior oil finish paint.

On the other hand, if painted wood surfaces display continuous patterns of deep cracks or if they are extensively blistering and peeling so that bare wood is visible, the old paint should be completely removed before repainting. (It should be emphasized that because peeling to bare wood—the most common type of paint problem—is most often caused by excess interior or exterior moisture that collects behind the paint film, the first step in treating peeling is to locate and remove the source or sources of moisture. If this is not done, the new paint will simply peel off.)

There are several acceptable methods for total paint removal, depending on the particular wooden element involved. They include such thermal devices as an electric heat plate with scraper for flat surfaces such as siding, window sills, and doors or an electric hot-air gun with profiled scraper for solid decorative elements such as gingerbread or molding. Chemical methods play a more limited, supplemental role in removing paint from historic exterior woodwork; for example, caustic or solvent-base strippers may be used to remove paint from window muntins because thermal devices can easily break the glass. Detachable wooden elements such as exterior shutters, balusters and columns, can probably best be stripped by means of immersion in commercial dip tanks because other methods are too laborious. Care must be taken in rinsing all chemical residue off the wood prior to painting or the new paint will not adhere.

Finally, if the exterior woodwork has been stripped to bare wood, priming should take place within 48 hours (unless the wood is wet, in which case it should be permitted to dry before painting). Application of a high quality oil type exterior primer will provide a surface over which either an oil or latex top coat can be successfully used.

### Rehabilitating Masonry Storefronts

Some storefronts are constructed of brick or stone, and like their metal and wooden counterparts, also may have been subjected to physical damage or alterations over time. Although mortar may have disintegrated, inappropriate surface coatings applied, and openings reduced or blocked up, careful rehabilitation will help restore the visual and physical integrity of the masonry storefront.

#### Repair and Replacement of Masonry

If obvious signs of deterioration—disintegrating mortar, spalling bricks or stone—are present, the causes (ground moisture, leaky downspouts, etc.) should be identified and corrected. Some repointing may be necessary on the masonry surface, but should be limited to areas in which so much mortar is missing that water accumulates in the mortar joints, causing further deterioration. New mortar should duplicate the composition, color, texture, and hardness, as well as the joint size and profile of the original. Badly spalling bricks may have to be replaced. Deteriorated stone may be replaced in kind, or with a matching substitute material; in some cases where not visually prominent, it may be covered with stucco, possibly scored to resemble blocks of stone.

#### Cleaning Masonry

Inappropriate cleaning techniques can be a major source of damage to historic masonry buildings. Historic masonry should be cleaned only when necessary to halt deterioration or to remove graffiti and stains, and always with the gentlest means possible, such as water and a mild detergent using natural bristle brushes, and/or a non-harmful chemical solution, both followed by a low-pressure water rinse.

It is important to remember that many mid-19th century brick buildings were painted immediately or soon after construction to protect poor quality brick or to imitate stone. Some historic masonry buildings not originally painted were painted at a later date to hide alterations or repairs, or to solve recurring maintenance or moisture problems. Thus, whether for reasons of historical tradition or practicality, it may be preferable to retain existing paint. If it is readily apparent that paint is not historic and is a later, perhaps unsightly or inappropriate treatment, removal may be attempted, but only if this can be carried out without damaging the historic masonry. Generally, paint removal from historic masonry may be accomplished successfully only with the use of specially formulated chemical paint removers. No abrasive techniques, such as wet or dry sandblasting should be considered. If non-historic paint cannot be removed without using abrasive methods, it is best to leave the masonry painted, although repainting in a compatible color may help visually.

Removing unsightly mastic from masonry presents a similarly serious problem. Its removal by mechanical means may result in abrading the masonry, and chemical and heat methods may prove ineffective, although solvents like acetone will aid in softening the hardened mastic. If the mastic has become brittle, a flat chisel may be used to pop it off; but this technique, if not undertaken with care, may result in damaging the masonry. And even if total removal is possible, the mastic may have permanently stained the masonry. Replacement of these masonry sec-

tions marred by mastic application may be one option in limited situations; individual pieces of stone or bricks that have been damaged by inappropriate alterations may be cut out and replaced with new pieces that duplicate the original. However, since an exact match will be nearly impossible to achieve, it may be necessary to paint the repaired masonry in order to create a harmonious facade. Replacement of a large area with new materials may not be acceptable as it may give the building a new, non-historic appearance inappropriate to the building style and period.

### Designing Replacement Storefronts

Where an architecturally or historically significant storefront no longer exists or is too deteriorated to save, a new front should be designed which is compatible with the size, scale, color, material, and character of the building. Such a design should be undertaken based on a thorough understanding of the building's architecture and, where appropriate, the surrounding streetscape (see figure 10). For example, just because upper floor windows are arched is not sufficient justification for designing arched openings for the new storefront. The new design should "read" as a storefront; filling in the space with brick or similar solid material is inappropriate for historic buildings. Similarly the creation of an arcade or other new design element, which alters the architectural and historic character of the building and its relationship with the street, should be avoided. The guidelines on page 8 can assist in developing replacement storefront designs that respect the historic character of the building yet meet current economic and code requirements.

#### Guidelines for Designing Replacement Storefronts

1. *Scale:* Respect the scale and proportion of the existing building in the new storefront design.
2. *Materials:* Select construction materials that are appropriate to the storefronts; wood, cast iron, and glass are usually more appropriate replacement materials than masonry which tends to give a massive appearance.
3. *Cornice:* Respect the horizontal separation between the storefront and the upper stories. A cornice or fascia board traditionally helped contain the store's sign.
4. *Frame:* Maintain the historic planar relationship of the storefront to the facade of the building and the streetscape (if appropriate). Most storefront frames are generally composed of horizontal and vertical elements.
5. *Entrances:* Differentiate the primary retail entrance from the secondary access to upper floors. In order to meet current code requirements, out-swinging doors generally must be recessed. Entrances should be placed where there were entrances historically, especially when echoed by architectural detailing (a pediment or projecting bay) on the upper stories.
6. *Windows:* The storefront generally should be as transparent as possible. Use of glass in doors, transoms, and display areas allows for visibility into and out of the store.
7. *Secondary Design Elements:* Keep the treatment of secondary design elements such as graphics and awnings as simple as possible in order to avoid visual clutter to the building and its streetscape.



Figure 10. (A) This existing storefront, added in the 1950's to a late 19th century brick building, extends beyond the plane of the facade: faced with anodized aluminum and permastone, it does not contribute to the architectural and historic character of the building. (B) This replacement design uses "lumberyard colonial" detailing, such as barn-type doors, shutters, small paned windows, and a wood shake pent roof. The design, detailing, and choice of materials are clearly inappropriate to this commercial building. (C) This replacement design retains the 1950's projecting canopy but symmetrical placement of the doors relates well to the second floor windows above; this contemporary design is compatible with the scale and character of the building. (D) This replacement design accurately restores the original appearance of the building; based on historical research and physical evidence, it too is an acceptable preservation approach. Drawings: Sharon C. Park, AIA

A restoration program requires thorough documentation of the historic development of the building prior to initiating work. If a restoration of the original storefront is contemplated, old photographs and prints, as well as physical evidence, should be used in determining the form and details of the original. Because storefronts are particularly susceptible to alteration in response to changing marketing techniques, it is worthwhile to find visual documentation from a variety of periods to have a clear understanding of the evolution of the storefront. Removal of later additions that contribute to the character of the building should not be undertaken.

### Other Considerations

#### Pigmented Structural Glass

The rehabilitation of pigmented structural glass storefronts, common in the 1930's, is a delicate and often frustrating task, due to the fragility and scarcity of the material. Typically the glass was installed against masonry walls with asphaltic mastic and a system of metal shelf angles bolted to the walls on three-foot centers. Joints between the panels were filled with cork tape or an elastic joint cement to cushion movement and prevent moisture infiltration.

The decision to repair or replace damaged glass panels should be made on a case-by-case basis. In some instances, the damage may be so minor or the likelihood of finding replacement glass so small, that repairing, reanchoring and/or stabilizing the damaged glass panel may be the only prudent choice. If the panel is totally destroyed or missing, it may be possible to replace with glass salvaged from a demolition; or a substitute material, such as "spandrel glass," which approximates the appearance of the original. Although pigmented structural glass is no longer readily available, occasionally long-established glass "jobbers" will have a limited supply to repair historic storefronts.

#### Awnings

Where based on historic precedent, consider the use of canvas awnings on historic storefronts (see figure 11).

Awnings can help shelter passersby, reduce glare, and conserve energy by controlling the amount of sunlight hitting the store window, although buildings with northern exposures will seldom functionally require them. Today's canvas awnings have an average life expectancy of between 4 and 7 years. In many cases awnings can disguise, in an inexpensive manner, later inappropriate alterations and can provide both additional color and a strong store identification. Fixed aluminum awnings and awnings simulating mansard roofs and umbrellas are generally inappropriate for older commercial buildings. If awnings are added, choose those that are made from soft canvas or vinyl materials rather than wood or metal; be certain that they are installed without damaging the building or visually impairing distinctive architectural features and can be operable for maximum energy conservation effect.

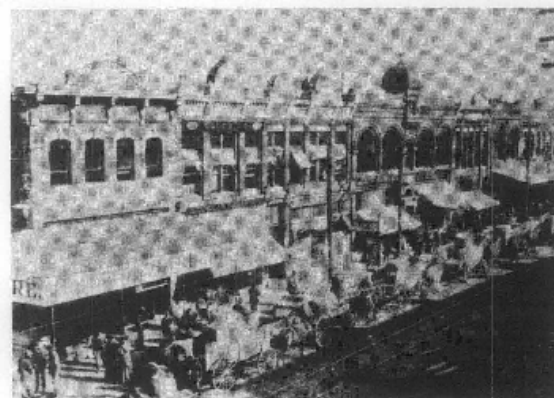


Figure 11. Try to locate old photographs or prints to determine what alterations have been made to the storefront and when they were undertaken. Awnings were common elements of storefronts at the turn of the century. They can be equally useful today.

**Signs**

Signs were an important aspect of 19th and early 20th century storefronts and today play an important role in defining the character of a business district. In examining historic streetscape photographs, one is struck by the number of signs—in windows, over doors, painted on exterior walls, and hanging over (and sometimes across) the street. While this confusion was part of the character of 19th century cities and towns, today's approach toward signs in historic districts tends to be much more conservative. Removal of some signs can have a dramatic effect in improving the visual appearance of a building; these include modern backlit fluorescent signs, large applied signs with distinctive corporate logos, and those signs attached to a building in such a way as to obscure significant architectural detailing. For this reason, their removal is encouraged in the process of rehabilitation. If new signs are designed, they should be of a size and style compatible with the historic building and should not cover or obscure significant architectural detailing or features. For many 19th century buildings, it was common to mount signs on the lintel above the first story. Another common approach, especially at the turn of the century, was to paint signs directly on the inside of the display windows. Frequently this was done in gold leaf. New hanging signs may be appropriate for historic commercial buildings, if they are of a scale and design compatible with the historic buildings. Retention of signs and advertising painted on historic walls, if of historic or artistic interest (especially where they provide evidence of early or original occupants), is encouraged.

**Paint Color**

Paint analysis can reveal the storefront's historic paint colors and may be worth undertaking if a careful restoration is desired. If not, the paint color should be, at a minimum, appropriate to the style and setting of the building. This also means that if the building is in a historic district, the color selection should complement the building in question as well as other buildings in the block. In general, color schemes for wall and major decorative trim or details should be kept simple; in most cases the color or colors chosen for a storefront should be used on other painted exterior detailing (windows, shutter, cornice, etc.) to unify upper and lower portions of the facade.

**Windows**

Glass windows are generally the most prominent features in historic storefronts, and care should be taken to ensure that they are properly maintained. For smaller paned windows with wooden frames, deteriorated putty should be removed manually, taking care not to damage wood along the rabbet. To reglaze, a bead of linseed oil-based putty should be laid around the perimeter of the rabbet; the glass pane pressed into place; glazing points inserted to hold the pane; and a final seal of putty beveled around the edge of the glass. For metal framed windows, glazing compound and special glazing clips are used to secure the glass; a final seal of glazing compound then is often applied. If the glass needs replacing, the new glass should match the original in size, color and reflective qualities. Mirrored or tinted glass are generally inappropriate

replacements for historic storefronts. The replacement of cracked or missing glass in large windows should be undertaken by professional glaziers.

**Code Requirements**

Alterations to a storefront called for by public safety, handicapped access, and fire codes can be difficult design problems in historic buildings. Negotiations can be undertaken with appropriate officials to ensure that all applicable codes are being met while maintaining the historic character of the original construction materials and features. If, for instance, doors opening inward must be changed, rather than replace them with new doors, it may be possible to reverse the hinges and stops so that they will swing outward.

**Summary**

A key to the successful rehabilitation of historic commercial buildings is the sensitive treatment of the first floor itself (see figure 12). Wherever possible, significant storefronts (be they original or later alterations), including windows, sash, doors, transoms, signs and decorative features, should be repaired in order to retain the historic character of the building. Where original or early storefronts no longer exist or are too deteriorated to save, the commercial character of the building should nonetheless be preserved—either through an accurate restoration based on historic research and physical evidence or a contemporary design which is compatible with the scale, design, materials, color and texture of the historic building. The sensitive rehabilitation of historic storefronts will not only enhance the architectural character of the overall building but will contribute to rejuvenating neighborhoods or business districts as well.



Figure 12. This photograph of three late 19th century commercial buildings clearly shows the impact of preserving and rehabilitating storefronts. The one on the right has been totally obscured by a "modern" front added in the 1950's. Although inappropriate alterations have taken place on the left storefront, it is still possible to determine the original configuration of the doors and display windows. The storefront in the middle has remained intact. Although in need of some minor maintenance work, the appeal of the original design and materials is immediately apparent.

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This publication has been prepared pursuant to the Economic Recovery Tax Act of 1981 which directs the Secretary of the Interior to certify rehabilitations of historic buildings that are consistent with their historic character; the advice and guidance provided in this brief will assist property owners in complying with the requirements of this law.

Preservation Briefs 11 has been developed under the technical editorship of Lee H. Nelson, AIA, Chief, Preservation Assistance Division, National Park Service, U.S. Department of the Interior, Washington, D.C. 20240. Comments on the usefulness of this information are welcomed and can be sent to Mr. Nelson at the above address.

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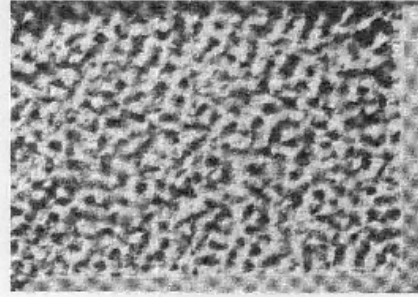
Cover drawing: This woodcut of the Joy Building, built in 1808 in Boston, shows early storefronts with shutters; note the profusion of signs covering the facade, advertising the services of the tenants.

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# 17 PRESERVATION BRIEFS

## Architectural Character: Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving Their Character



Lee H. Nelson, FAIA



U.S. Department of the Interior  
National Park Service  
Cultural Resources  
Heritage Preservation Services

The Secretary of the Interior's "Standards for Historic Preservation Projects" embody two important goals: 1) the preservation of historic materials and, 2) the preservation of a building's distinguishing character. Every old building is unique, with its own identity and its own distinctive character. Character refers to all those visual aspects and physical features that comprise the appearance of every historic building. Character-defining elements include the overall shape of the building, its materials, craftsmanship, decorative details, interior spaces and features, as well as the various aspects of its site and environment.

The purpose of this Brief is to help the owner or the architect identify those features or elements that give the building its *visual character* and that should be taken into account in order to preserve them to the maximum extent possible.

There are different ways of understanding old buildings. They can be seen as examples of specific building types, which are usually related to a building's function, such as schools, courthouses or churches. Buildings can be studied as examples of using specific materials such as concrete, wood, steel, or limestone. They can also be considered as examples of an historical period, which is often related to a specific architectural style, such as Gothic Revival farmhouses, one-story bungalows, or Art Deco apartment buildings.

There are many other facets of an historic building besides its functional type, its materials or construction or style that contribute to its historic qualities or significance. Some of these qualities are feelings conveyed by the sense of time and place or in buildings associated with events or people. A complete understanding of any property may require documentary research about its style, construction, function, its furnishings or contents; knowledge about the original builder, owners, and later occupants; and knowledge about the evolutionary history of the building. Even though buildings may be of historic, rather than architectural significance, it is their tangible elements that embody its significance for association with specific events or persons and it is those *tangible elements* both on the exterior and interior that should be preserved.

Therefore, the approach taken in this Brief is limited to identifying those visual and tangible aspects of the historic building. While this may aid in the planning process for carrying out any ongoing or new use or restoration of the building, this approach is not a

substitute for developing an understanding about the significance of an historic building and the district in which it is located.

If the various materials, features and spaces that give a building its visual character are not recognized and preserved, then essential aspects of its character may be damaged in the process of change.

A building's character can be irreversibly damaged or changed in many ways, for example, by inappropriate repointing of the brickwork, by removal of a distinctive side porch, by changes to the window sash, by changes to the setting around the building, by changes to the major room arrangements, by the introduction of an atrium, by painting previously unpainted woodwork, etc.

### A Three-Step Process to Identify A Building's Visual Character

This Brief outlines a three-step approach that can be used by anyone to identify those materials, features and spaces that contribute to the visual character of a building. This approach involves first examining the building from afar to understand its overall setting and architectural context; then moving up very close to appreciate its materials and the craftsmanship and surface finishes evident in these materials; and then going into and through the building to perceive those spaces, rooms and details that comprise its interior visual character.

#### Step 1: Identify the Overall Visual Aspects

Identifying the overall visual character of a building is nothing more than looking at its distinguishing physical aspects without focusing on its details. The major contributors to a building's overall character are embodied



in the general aspects of its *setting*; the *shape* of the building; its *roof* and roof features, such as chimneys or cupolas; the various *projections* on the building, such as porches or bay windows; the *recesses* or voids in a building, such as open galleries, arcades, or recessed balconies; the *openings* for windows and doorways; and finally the various exterior *materials* that contribute to the building's character. Step one involves looking at the building from a distance to understand the character of its site and setting, and it involves walking around the building where that is possible. Some buildings will have one or more sides that are more important than the others because they are more highly visible. This does not mean that the rear of the building is of no value whatever but it simply means that it is less important to the overall character. On the other hand, the rear may have an interesting back porch or offer a private garden space or some other aspect that may contribute to the visual character. Such a general approach to looking at the building and site will provide a better understanding of its overall character without having to resort to an infinitely long checklist of its possible features and details. Regardless of whether a building is complicated or relatively plain, it is these broad categories that contribute to an understanding of the overall character rather than the specifics of architectural features such as moldings and their profiles.

#### **Step 2: Identify the Visual Character at Close Range**

Step two involves looking at the building at close range or arm's length, where it is possible to see all the surface qualities of the materials, such as their *color* and *texture*, or surface evidence of craftsmanship or age. In some instances, the visual character is the result of the juxtaposition of materials that are contrastingly different in their color and texture. The surface qualities of the materials may be important because they impart the very sense of craftsmanship and age that distinguishes historic buildings from other buildings. Furthermore, many of these close up qualities can be easily damaged or obscured by work that affects those surfaces. Examples of this could include painting previously unpainted masonry, rotary disk sanding of smooth wood siding to remove paint, abrasive cleaning of tooled stonework, or repointing reddish mortar joints with gray portland cement.

There is an almost infinite variety of surface materials, textures and finishes that are part of a building's character which are fragile and easily lost.

#### **Step 3: Identify the Visual Character of the Interior Spaces, Features and Finishes**

Perceiving the character of interior spaces can be somewhat more difficult than dealing with the exterior.

In part, this is because so much of the exterior can be seen at one time and it is possible to grasp its essential character rather quickly. To understand the interior character, it is necessary to move through the spaces one at a time. While it is not difficult to perceive the character of one individual room, it becomes more difficult to deal with spaces that are interconnected and interrelated. Sometimes, as in office buildings, it is the vestibules or lobbies or corridors that are important to the interior character of the building. With other groups of buildings the visual qualities of the interior are related to the plan of the building, as in a church with its axial plan creating a narrow tunnel-like space which obviously has a different character than an open space like a sports pavilion. Thus the shape of the space may be an essential part of its character. With some buildings it is possible to perceive that there is a visual linkage in a sequence of spaces, as in a hotel, from the lobby to the grand staircase to the ballroom. Closing off the openings between those spaces would change the character from visually linked spaces to a series of closed spaces. For example, in a house that has a front and back parlor linked with an open archway, the two rooms are perceived together, and this visual relationship is part of the character of the building. To close off the open archway would change the character of such a residence.

The importance of interior features and finishes to the character of the building should not be overlooked. In relatively simple rooms, the primary visual aspects may be in features such as fireplace mantels, lighting fixtures or wooden floors. In some rooms, the absolute plainness is the character-defining aspect of the interior. So-called secondary spaces also may be important in their own way, from the standpoint of history or because of the family activities that occurred in those rooms. Such secondary spaces, while perhaps historically significant, are not usually perceived as important to the *visual* character of the building. Thus we do not take them into account in the visual understanding of the building.

#### **Conclusion**

Using this three-step approach, it is possible to conduct a walk through and identify all those elements and features that help define the visual character of the building. In most cases, there are a number of aspects about the exterior and interior that are important to the character of an historic building. The visual emphasis of this brief will make it possible to ascertain those things that should be preserved because their loss or alteration would diminish or destroy aspects of the historic character whether on the outside, or on the inside of the building.



**Overall Visual Character: Shape**

The shape of a building can be an important aspect of its overall visual character. The building illustrated here, for example, has a distinctive horizontal box-like shape with the middle portion of the box projecting up an extra story. This building has other visual aspects that help define its overall character, including the pattern of vertical bands of windows, the decorative horizontal bands which separate the base of the building from the upper floors, the dark brown color of the brick, the large arched entranceway, and the castle-like tower behind the building.



**Overall Visual Character: Shape**

It should not be assumed that only large or unusual buildings have a shape that is distinctive or identifiable. The front wall of this modest building has a simple three-part shape that is the controlling aspect of its overall visual character. It consists of a large center bay with a two story opening that combines the storefront and the windows above. The upward projecting parapet and the decorative stonework also relate to and emphasize its shape. The flanking narrow bays enframe the side windows and the small iron balconies, and the main entrance doorway into the store. Any changes to the center portion of this three-part shape, could drastically affect the visual character of this building. Photo by Emogene A. Bevitt



**Overall Visual Character: Openings**

Window and door openings can be important to the overall visual character of historic buildings. This view shows only part of a much larger building, but the windows clearly help define its character, partly because of their shape and rhythm: the upper floor windows are grouped in a 4,3,4,1,4 rhythm, and the lower floor windows are arranged in a regular 1,1,1,... rhythm. The individual windows are tall, narrow and arched, and they are accented by the different colored arched heads, which are connected where there are multiple windows so that the color contrast is a part of its character. If additional windows were inserted in the gap of the upper floors, the character would be much changed, as it would if the window heads were painted to match the color of the brick walls. Photo by Susan I. Dynes



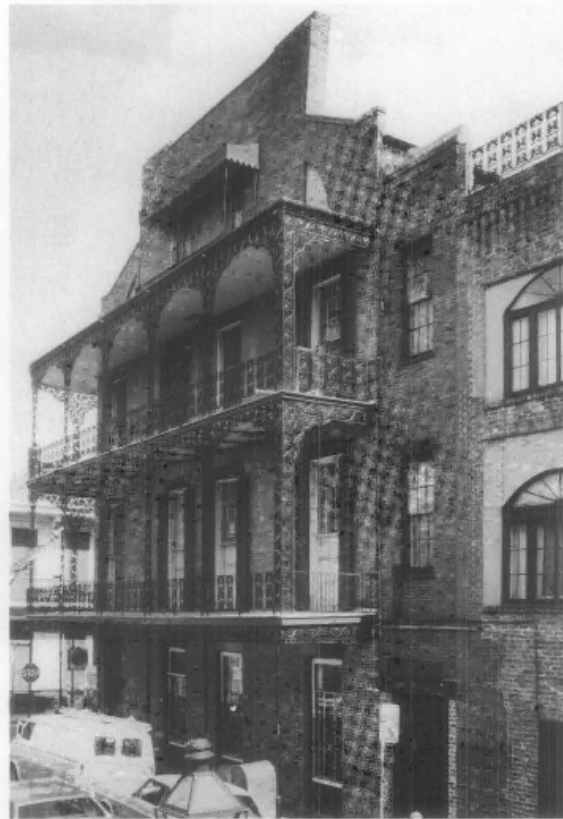
**Overall Visual Character: Openings**

The opening illustrated here dominates the visual character of this building because of its size, shape, location, materials, and craftsmanship. Because of its relation to the generous staircase, this opening places a strong emphasis on the principal entry to the building. Enclosing this arcade-like entry with glass, for example, would materially and visually change the character of the building. Photo by Lee H. Nelson.



**Overall Visual Character: Roof and Related Features**

This building has a number of character-defining aspects which include the windows and the decorative stonework, but certainly the roof and its related features are visually important to its overall visual character. The roof is not only highly visible, it has elaborate stone dormers, and it also has decorative metalwork and slatework. The red and black slates of differing sizes and shapes are laid in patterns that extend around the roof of this large and freestanding building. Any changes to this patterned slatework, or to the other roofing details would damage the visual character of the building. Photo by Laurie R. Hammel



**Overall Visual Character: Projections**

A projecting porch or balcony can be very important to the overall visual character of almost any building and to the district in which it is located. Despite the size of this building (3 1/2 stories), and its distinctive roofline profile, and despite the importance of the very large window openings, the lacy wrap-around iron balcony is singularly important to the visual character of this building. It would seriously affect the character to remove the balcony, to enclose it, or to replace it with a balcony lacking the same degree of detail of the original material. Photo by Baird M. Smith



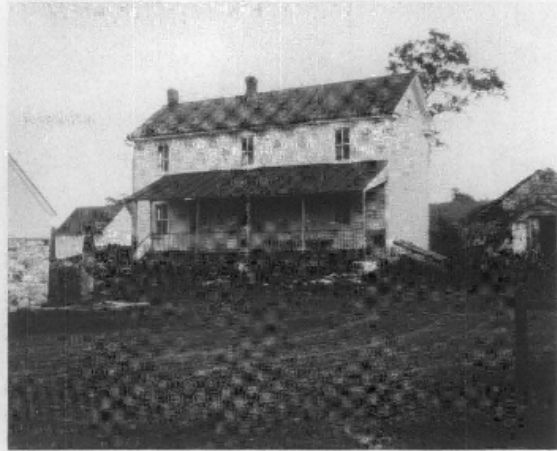
**Overall Visual Character: Roof and Related Features**

On this building, the most important visual aspects of its character are the roof and its related features such as the dormers and chimneys. The roof is important to the visual character because its steepness makes it highly visible, and its prominence is reinforced by the patterned tinwork, the six dormers and the two chimneys. Changes to the roof or its features, such as removal or alterations to the dormers, for example, would certainly change the character of this building. This does not discount the importance of its other aspects, such as the porch, the windows, the brickwork, or its setting; but the roof is clearly crucial to understanding the overall visual character of this building as seen from a distance. Photo by Lee H. Nelson



**Overall Visual Character: Projections**

Since these are row houses, any evaluation of their visual exterior character is necessarily limited to the front and rear walls; and while there are a number of things competing for attention in the front, it is the half round projecting bays with their conical roofs that contribute most prominently to the visual character. Their removal would be a devastating loss to the overall character, but even if preserved, the character could be easily damaged by changes to their color (as seen in the left bay which has been painted a dark color), or changes to their windows, or changes to their tile roofs. Though these houses have other fine features that contribute to the visual character and are worthy of preservation, these half-round bays demonstrate the importance of projecting features on an already rich and complex facade. Because of the repetitive nature of these projecting bays on adjacent row houses, along with the buildings' size, scale, openings, and materials, they also contribute to the overall visual character of the streetscape in the historic district. Any evaluation of the visual character of such a building should take into account the context of this building within the district. Photo by Lee H. Nelson



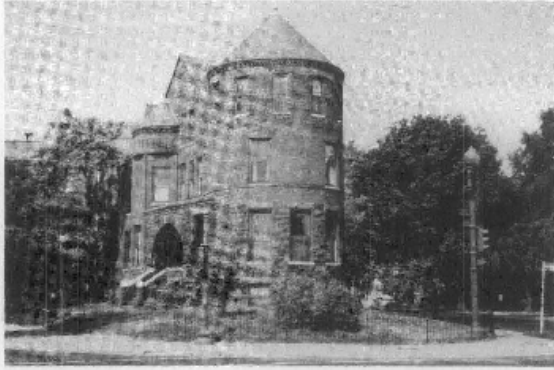
**Overall Visual Character: Projections**

Many buildings have projecting features such as porches, bay windows, or overhanging roofs, that help define their overall visual character. This projecting porch because of its size and shape, and because it copies the pitch and material of the main roof, is an important contributor to the visual character of this simple farmhouse. The removal or alteration of this porch would drastically alter the character of this building. If the porch were enclosed with wood or glass, or if gingerbread brackets were added to the porch columns, or if the tin roof was replaced with asphalt, or if the porch railing was opened to admit a center stairway, the overall visual character could be seriously damaged. Although this projecting porch is an important feature, almost any other change to this house, such as changes to the window pattern, or changes to the main roof, or changes to the setting, would also change its visual character. Photo by Hugh C. Miller



**Overall Visual Character: Trim**

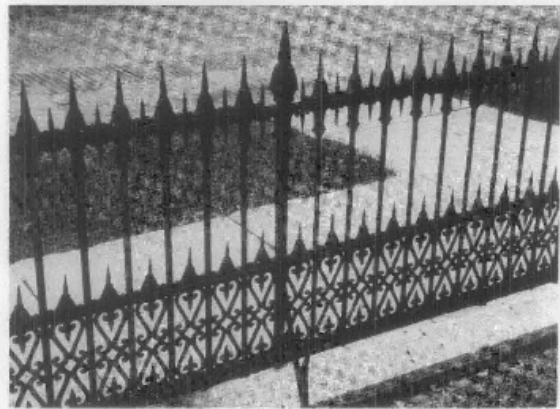
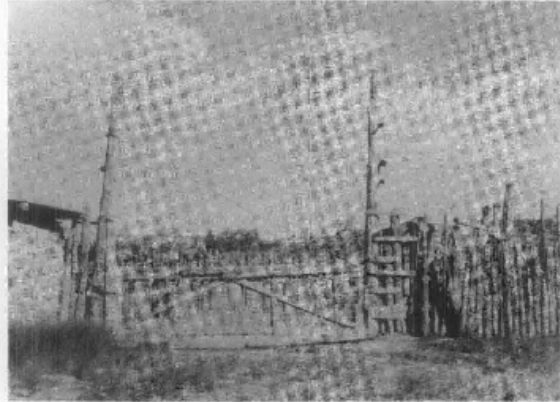
If one were to analyze the overall shape or form of this building, it would be seen that it is a gable-roofed house with dormers and a wrap-around porch. It is similar to many other houses of the period. It is the wooden trim on the eaves and around the porch that gives this building its own identity and its special visual character. Although such wooden trim is vulnerable to the elements, and must be kept painted to prevent deterioration; the loss of this trim would seriously damage the overall visual character of this building, and its loss would obliterate much of the close-up visual character so dependent upon craftsmanship for the moldings, carvings, and the see-through jigsaw work. Photo by Hugh C. Miller



**Overall Visual Character: Setting**

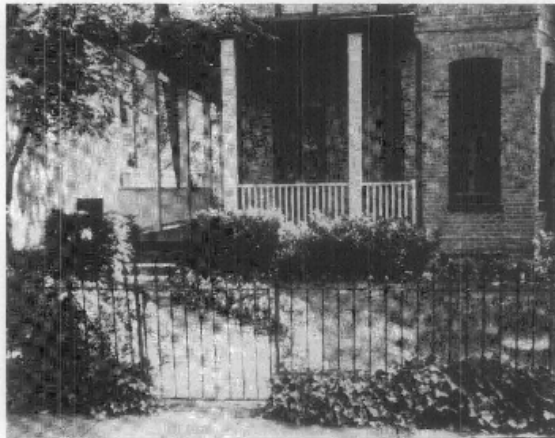
In the process of identifying the overall visual character, the aspect of setting should not be overlooked. Obviously, the setting of urban row houses differs from that of a mansion with a designed landscape. However, there are many instances where the relationship between the building and its place on the streetscape, or its place in the rural environment, in other words its setting, may be an important contributor to its overall character.

In this instance, the corner tower and the arched entryway are important contributors to the visual character of the building itself, but there is also a relationship between the building and the two converging streets that is also an important aspect of this historic building. The curb, sidewalk, fence, and the yard interrelate with each other to establish a setting that is essential to the overall visual character of the historic property. Removing these elements or replacing them with a driveway or parking court would destroy an important visual aspect. Photo by Lee H. Nelson



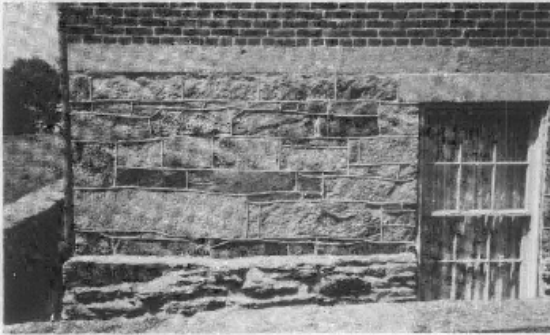
**Overall Visual Character: Setting**

Among the various visual aspects relating to the setting of an historic property are such site features as gardens, walks, fences, etc. This can include their design and materials. There is a dramatic difference in the visual character between these two fence constructions—one utilizing found materials with no particular regard to their uniformity of size or placement, and the other being a product of the machine age utilizing cast iron components assembled into a pattern of precision and regularity. If the corral fence were to be repaired or replaced with lumberyard materials its character would be dramatically compromised. The rhythm and regularity of the cast iron fence is so important to its visual character that its character could be altered by accidental damage or vandalism, if some of the fence top spikes were broken off thus interrupting the rhythm or pattern. Photos by Lee H. Nelson



**Overall Visual Character: Setting**

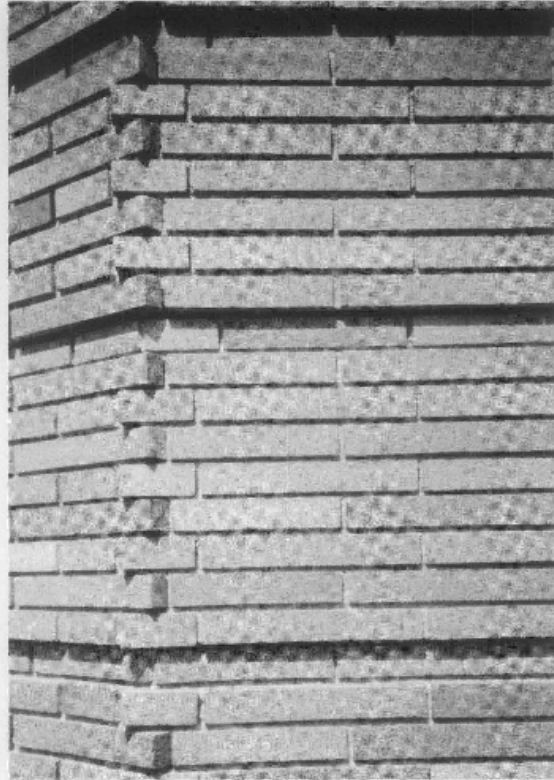
Even architecturally modest buildings frequently will have a setting that contributes to their overall character. In this very urban district, set-backs are the exception, so that the small front yard is something of a luxury, and it is important to the overall character because of its design and materials, which include the iron fence along the sidewalk, the curved walk leading to the porch, and the various plantings. In a district where parking spaces are in great demand, such front yards are sometimes converted to off-street parking, but in this instance, that would essentially destroy its setting and would drastically change the visual character of this historic property. Photo by Lee H. Nelson



**Arm's Length Visual Character: Materials**

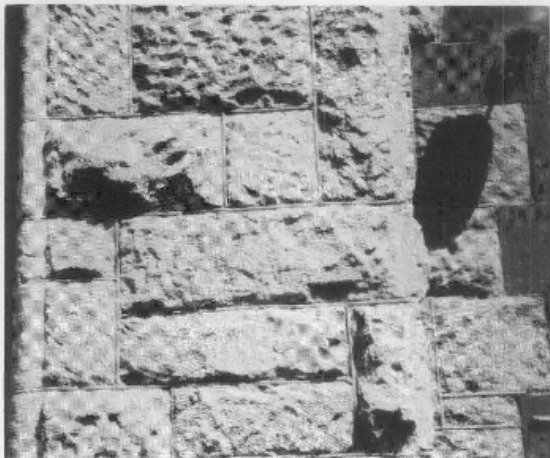
At arm's length, the visual character is most often determined by the surface qualities of the materials and craftsmanship; and while these aspects are often inextricably related, the original choice of materials often plays the dominant role in establishing the close-range character because of the color, texture, or shape of the materials.

In this instance, the variety and arrangement of the materials is important in defining the visual character, starting with the large pieces of broken stone which form the projecting base for the building walls, then changing to a wall of roughly rectangular stones which vary in size, color, and texture, all with accentuated, projecting beads of mortar, then there is a rather precise and narrow band of cut and dressed stones with minimal mortar joints, and finally, the main building walls are composed of bricks, rather uniform in color, with fairly generous mortar joints. It is the juxtaposition and variety of these materials (and of course, the craftsmanship) that is very important to the visual character. Changing the raised mortar joints, for example, would drastically alter the character at arm's length. Photo by Lee H. Nelson



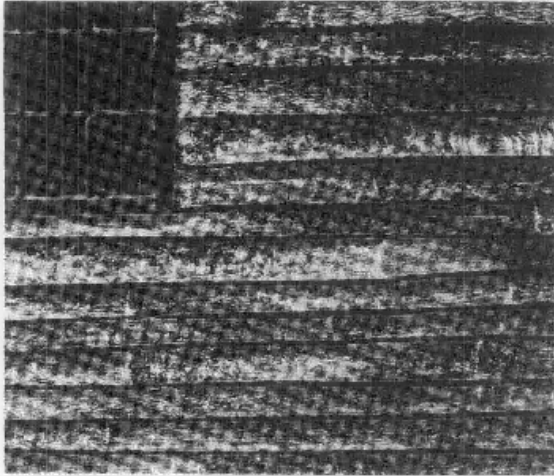
**Arm's Length Visual Character: Craft Details**

The arm's length visual character of this building is a combination of the materials and the craft details. Most of the exterior walls of this building consist of early 20th century Roman brick, precisely made, unusually long bricks, in varying shades of yellow-brown, with a noticeable surface spotting of dark iron pyrites. While this brick is an important contributor to the visual character, the related craft details are perhaps more important, and they consist of: unusually precise coursing of the bricks, almost as though they were laid up using a surveyor's level; a row of recessed bricks every ninth course, creating a shadow pattern on the wall; deeply recessed mortar joints, creating a secondary pattern of shadows; and a toothed effect where the bricks overlap each other at the corner of the building. The cumulative effect of this artisanship is important to the arm's length visual character, and it is evident that it would be difficult to match if it were damaged, and the effect could be easily damaged through insensitive treatments such as painting the brickwork or by careless repointing. Photo by Lee H. Nelson



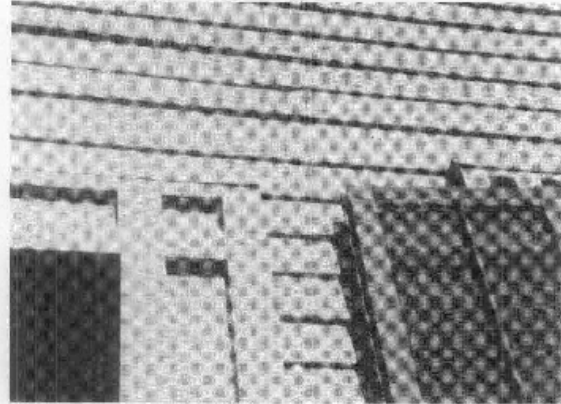
**Arm's Length Visual Character: Craft Details**

There are many instances where craft details dominate the arm's length visual character. As seen here, the craft details are especially noticeable because the stones are all of a uniform color, and they are all squared off, but their surfaces were worked with differing tools and techniques to create a great variety of textures, resulting in a tour-de-force of craft details. This texture is very important at close range. It was a deliberately contrived surface that is an important contributor to the visual character of this building. Photo by Lee H. Nelson



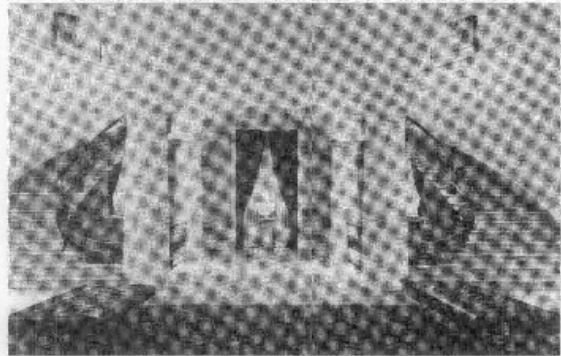
***Arm's Length Visual Character: Craft Details***

On some buildings, there are subtle aspects of visual character that cannot be perceived from a distance. This is especially true of certain craft details that can be seen only at close range. On this building, it is easily understood that the narrow, unpainted, and weathered clapboards are an important aspect of its overall visual character; but at close range there are a number of subtle but very important craft details that contribute to the handmade quality of this building, and which clearly differentiate it from a building with machine-sawn clapboards. The clapboards seen here were split by hand and the bottom edges were not dressed, so that the boards vary in width and thickness, and thus they give a very uneven shadow pattern. Because they were split from oak that is unpainted, there are occasional wavy rays in the wood that stand against the grain. Also noticeable is the fact that the boards are of relatively short lengths, and that they have feather-edged ends that overlap each other, a detail that is very different from butted joints. The occasional large nail heads and the differential silver-gray weathering add to the random quality of the clapboards. All of these qualities contribute to the arm's length visual character. Photo by Lee H. Nelson



***Arm's Length Visual Character: Craft Details***

While hand-split clapboards are distinctive visual elements in their own way, machine-sawn and painted wood siding is equally important to the overall visual character in most other instances. At arm's length, however, the machine-sawn siding may not be so distinctive; but there might be other details that add visual character to the wooden building, such as the details of wooden trim and louvered shutters around the windows (as seen here), or similar surface textures on other buildings, such as the saw marks on wall shingles, the joints in leaded glass, decorative tinwork on a rain conductor box, the rough surface of pebble-dash stuccowork, or the pebbly surface of exposed aggregate concrete. Such surfaces can only be seen at arm's length and they add to the visual character of a historic building. Photo by Hugh C. Miller



***Interior Visual Character: Individually Important Spaces***

In assessing the interior visual character of any historic building, it is necessary to ask whether there are spaces that are important to the character of this particular building, whether the building is architecturally rich or modest, or even if it is a simple or utilitarian structure.

The character of the individually important space which is illustrated here is a combination of its size, the twin curving staircases, the massive columns and curving vaulted ceilings, in addition to the quality of the materials in the floor and in the stairs. If the ceiling were to be lowered to provide space for heating ducts, or if the stairways were to be enclosed for code reasons, the shape and character of this space would be damaged, even if there was no permanent physical damage. Such changes can easily destroy the visual character of an individually important interior space. Thus, it is important that the visual aspects of a building's interior character be recognized before planning any changes or alterations. Photo by National Portrait Gallery

**Interior Visual Character: Related Spaces**

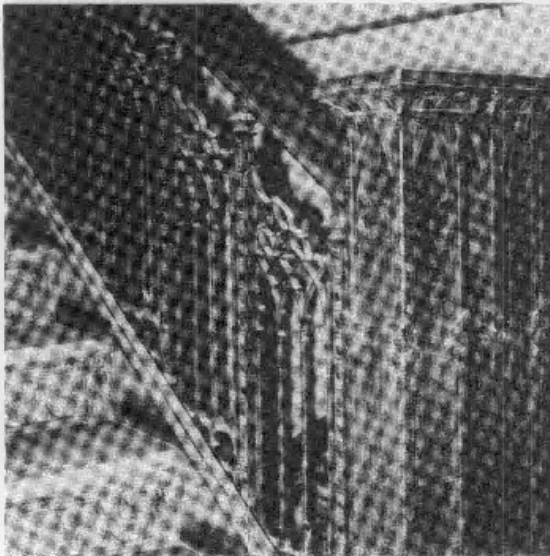
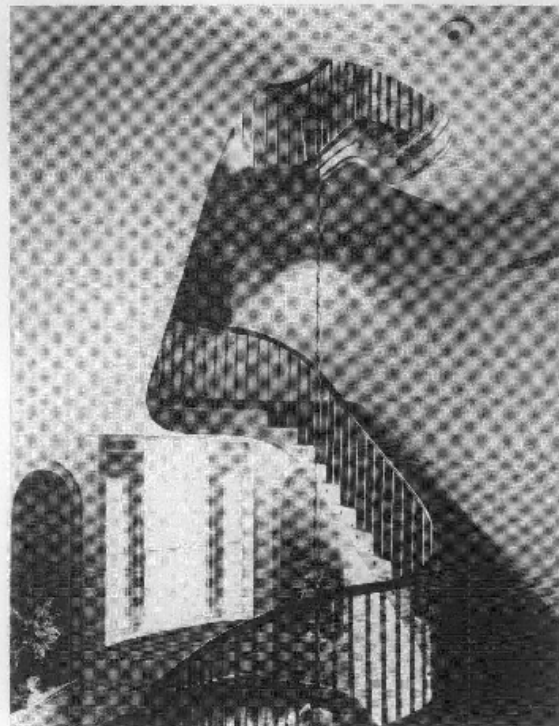
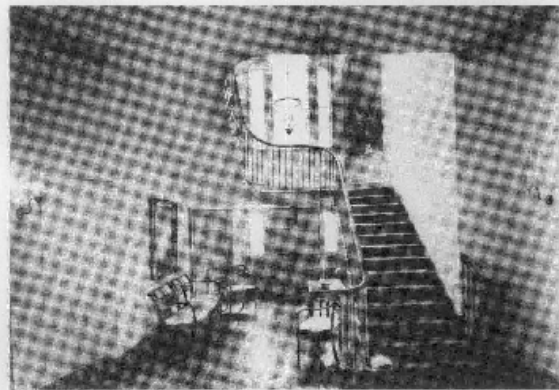
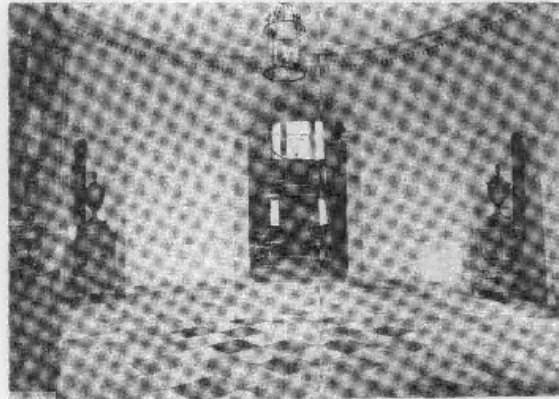
Many buildings have interior spaces that are visually or physically related so that, as you move through them, they are perceived not as separate spaces, but as a sequence of related spaces that are important in defining the interior character of the building. The example which is illustrated here consists of three spaces that are visually linked to each other.

The first of these spaces is the vestibule which is of a generous size and unusual in its own right, but more important, it visually relates to the second space which is the main stairhall.

The hallway is the circulation artery for the building, and leads both horizontally and vertically to other rooms and spaces, but especially to the open and inviting stairway.

The stairway is the third part of this sequence of related spaces, and it provides continuing access to the upper floors.

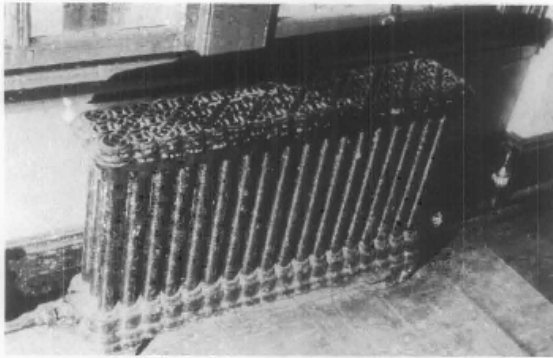
These related spaces are very important in defining the interior character of this building. Almost any change to these spaces, such as installing doors between the vestibule and the hallway, or enclosing the stair would seriously impact their character and the way that character is perceived. Top photo by Mel Chamowitz, others by John Tennant



**Interior Visual Character: Interior Features**

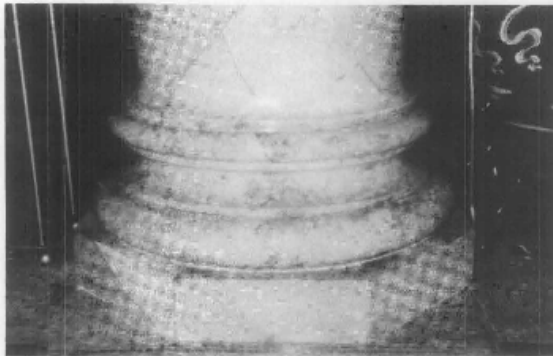
Interior features are three-dimensional building elements or architectural details that are an integral part of the building as opposed to furniture. Interior features are often important in defining the character of an individual room or space. In some instances, an interior feature, like a large and ornamental open stairway may dominate the visual character of an entire building. In other instances, a modest iron stairway (like the one illustrated here) may be an important interior feature, and its preservation would be crucial to preserving the interior character of the building. Such features can also include the obvious things like fireplace mantles, plaster ceiling medallions, or panelling, but they also extend to features like hardware, lighting fixtures, bank tellers cages, decorative elevator doors, etc. Photo by David W. Look





**Interior Visual Character: Interior Features**

Modern heating or cooling devices usually add little to the interior character of a building; but historically, radiators, for instance, may have contributed to the interior character by virtue of their size or shape, or because of their specially designed bases, piping, and decorative grillage or enclosures. Sometimes they were painted with several colors to highlight their integral, cast-in details. In more recent times, it has been common to overpaint and conceal such distinctive aspects of earlier heating and plumbing devices, so that we seldom have the opportunity to realize how important they can be in defining the character of interior rooms and spaces. For that reason, it is important to identify their character-defining potential, and consider their preservation, retention, or restoration. Photo by David W. Look



**Interior Visual Character: Surface Materials and Finishes**

When identifying the visual character of historic interior spaces one should not overlook the importance of those materials and finishes that comprise the surfaces of walls, floors and ceilings. The surfaces may have evidence of either hand-craft or machine-made products that are important contributors to the visual character, including patterned or inlaid designs in the wood flooring, decorative painting practices such as stenciling, imitation marble or wood grain, wallpapering, tinwork, tile floors, etc.

The example illustrated here involves a combination of real marble at the base of the column, imitation marble patterns on the plaster surface of the column (a practice called scagliola), and a tile floor surface that uses small mosaic tiles arranged to form geometric designs in several different colors. While such decorative materials and finishes may be important in defining the interior visual character of this particular building, it should be remembered that in much more modest buildings, the plainness of surface materials and finishes may be an essential aspect of their historic character. Photo by Lee H. Nelson



**Fragility of A Building's Visual Character**

Some aspects of a building's visual character are fragile and are easily lost. This is true of brickwork, for example, which can be irreversibly damaged with inappropriate cleaning techniques or by insensitive repointing practices. At least two factors are important contributors to the visual character of brickwork, namely the brick itself and the craftsmanship. Between these, there are many more aspects worth noting, such as color range of bricks, size and shape variations, texture, bonding patterns, together with the many variable qualities of the mortar joints, such as color, width of joint and tooling. These qualities could be easily damaged by painting the brick, by raking out the joint with power tools, or repointing with a joint that is too wide. As seen here during the process of repointing, the visual character of this front wall is being dramatically changed from a wall where the bricks predominate, to a wall that is visually dominated by the mortar joints. Photo by Lee H. Nelson

Preservation Briefs 17

# The Architectural Character Checklist/Questionnaire

Lee H. Nelson, FAIA  
National Park Service

This checklist can be taken to the building and used to identify those aspects that give the building and setting its essential visual qualities and character. This checklist consists of a series of questions that are designed to help in identifying those things that contribute to a building's character. The use of this checklist involves the three-step process of looking for: 1) the overall visual aspects, 2) the visual character at close range, and 3) the visual character of interior spaces, features and finishes.

Because this is a process to identify *architectural character*, it does not address those intangible qualities that give a property or building or its contents its historic significance, instead this checklist is organized on the assumption that historic significance is embodied in those *tangible* aspects that include the building's setting, its form and fabric.

## Step One

### 1. Shape

What is there about the form or shape of the building that gives the building its identity? Is the shape distinctive in relation to the neighboring buildings? Is it simply a low, squat box, or is it a tall, narrow building with a corner tower? Is the shape highly consistent with its neighbors? Is the shape so complicated because of wings, or ell, or differences in height, that its complexity is important to its character? Conversely, is the shape so simple or plain that adding a feature like a porch would change that character? Does the shape convey its historic function as in smoke stacks or silos?

Notes on the Shape or Form of the Building:

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### 2. Roof and Roof Features

Does the roof shape or its steep (or shallow) slope contribute to the building's character? Does the fact that the roof is highly visible (or not visible at all) contribute to the architectural identity of the building? Are certain roof features important to the profile of the building against the sky or its background, such as cupolas, multiple chimneys, dormers, cresting, or weathervanes? Are the roofing materials or their colors or their patterns (such as patterned slates) more noticeable than the shape or slope of the roof?

Notes on the Roof and Roof Features:

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### 3. Openings

Is there a rhythm or pattern to the arrangement of windows or other openings in the walls; like the rhythm of windows in a factory building, or a three-part window in the front bay of a house; or is there a noticeable relationship between the width of the window openings and the wall space between the window openings? Are there distinctive openings, like a large arched entranceway, or decorative window lintels that accentuate the importance of the window openings, or unusually shaped windows, or patterned window sash, like small panes of glass in the windows or doors, that are important to the character? Is the plainness of the window openings such that adding shutters or gingerbread trim would radically change its character? Is there a hierarchy of facades that make the front windows more important than the side windows? What about those walls where the absence of windows establishes its own character?

Notes on the Openings:

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### 4. Projections

Are there parts of the building that are character-defining because they project from the walls of the building like porches, cornices, bay windows, or balconies? Are there turrets, or widely overhanging eaves, projecting pediments or chimneys?

Notes on the Projections:

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### 5. Trim and Secondary Features

Does the trim around the windows or doors contribute to the character of the building? Is there other trim on the walls or around the projections that, because of its decoration or color or patterning contributes to the character of the building? Are there secondary features such as shutters, decorative gables, railings, or exterior wall panels?

Notes on the Trim and Secondary Features:

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### 6. Materials

Do the materials or combination of materials contribute to the overall character of the building as seen from a distance because of their color or patterning, such as broken faced stone, scalloped wall shingling, rounded rock foundation walls, boards and battens, or textured stucco?

Notes on the Materials:

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### 7. Setting

What are the aspects of the setting that are important to the visual character? For example, is the alignment of buildings along a city street and their relationship to the sidewalk the essential aspect of its setting? Or, conversely, is the essential character dependent upon the tree plantings and out buildings which surround the farmhouse? Is the front yard important to the setting of the modest house? Is the specific site important to the setting such as being on a hilltop, along a river, or, is the building placed on the site in such a way to enhance its setting? Is there a special relationship to the adjoining streets and other buildings? Is there a view? Is there fencing, planting, terracing, walkways or any other landscape aspects that contribute to the setting?

Notes on the Setting:

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**Step Two**

**8. Materials at Close Range**

Are there one or more materials that have an inherent texture that contributes to the close range character, such as stucco, exposed aggregate concrete, or brick textured with vertical grooves? Or materials with inherent colors such as smooth orange-colored brick with dark spots of iron pyrites, or prominently veined stone, or green serpentine stone? Are there combinations of materials, used in juxtaposition, such as several different kinds of stone, combinations of stone and brick, dressed stones for window lintels used in conjunction with rough stones for the wall? Has the choice of materials or the combinations of materials contributed to the character?

Notes on the Materials at Close Range:

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**9. Craft Details**

Is there high quality brickwork with narrow mortar joints? Is there hand-tooled or patterned stonework? Do the walls exhibit carefully struck vertical mortar joints and recessed horizontal joints? Is the wall shinglework laid up in patterns or does it retain evidence of the circular saw marks or can the grain of the wood be seen through the semi-transparent stain? Are there hand split or hand-dressed clapboards, or machine smooth beveled siding, or wood rusticated to look like stone, or Art Deco zigzag designs executed in stucco?

Almost any evidence of craft details, whether handmade or machinemade, will contribute to the character of a building because it is a manifestation of the materials, of the times in which the work was done, and of the tools and processes that were used. It further reflects the effects of time, of maintenance (and/or neglect) that the building has received over the years. All of these aspects are a part of the surface qualities that are seen only at close range.

Notes on the Craft Details:

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**Step Three**

**10. Individual Spaces**

Are there individual rooms or spaces that are important to this building because of their size, height, proportion, configuration, or function, like the center hallway in a house, or the bank lobby, or the school auditorium, or the ballroom in a hotel, or a courtroom in a county courthouse?

Notes on the Individual Spaces:

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**11. Related Spaces and Sequences of Spaces**

Are there adjoining rooms that are visually and physically related with large doorways or open archways so that they are perceived as related rooms as opposed to separate rooms? Is there an important sequence of spaces that are related to each other, such as the sequence from the entry way to the lobby to the stairway and to the upper balcony as in a theatre; or the sequence in a residence from the entry vestibule to the hallway to the front parlor, and on through the sliding doors to the back parlor; or the sequence in an office building from the entry vestibule to the lobby to the bank of elevators?

Notes on the Related Spaces and Sequences of Spaces:

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**12. Interior Features**

Are there interior features that help define the character of the building, such as fireplace mantels, stairways and balustrades, arched openings, interior shutters, inglenooks, cornices, ceiling medallions, light fixtures, balconies, doors,

windows, hardware, wainscotting, panelling, trim, church pews, courtroom bars, teller cages, waiting room benches?

Notes on the Interior Features:

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**13. Surface Finishes and Materials**

Are there surface finishes and materials that can affect the design, the color or the texture of the interior? Are there materials and finishes or craft practices that contribute to the interior character, such as wooden parquet floors, checkerboard marble floors, pressed metal ceilings, fine hardwoods, grained doors or marbled surfaces, or polychrome painted surfaces, or stenciling, or wallpaper that is important to the historic character? Are there surface finishes and materials that, because of their plainness, are imparting the essential character of the interior such as hard or bright, shiny wall surfaces of plaster or glass or metal?

Notes on the Surface Finishes and Materials:

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**14. Exposed Structure**

Are there spaces where the exposed structural elements define the interior character such as the exposed posts, beams, and trusses in a church or train shed or factory? Are there rooms with decorative ceiling beams (non-structural) in bungalows, or exposed vigas in adobe buildings?

Notes on the Exposed Structure:

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This concludes the three-step process of identifying the visual aspects of historic buildings and is intended as an aid in preserving their character and other distinguishing qualities. It is not intended as a means of understanding the significance of historical properties or districts, nor of the events or people associated with them. That can only be done through other kinds of research and investigation.

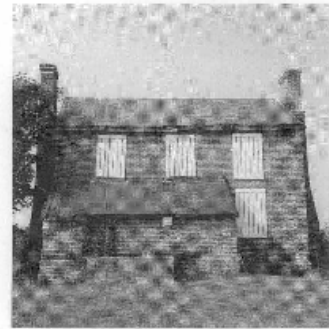
This Preservation Brief was originally developed as a slide talk/methodology in 1982 to discuss the use of the Secretary of the Interior's Standards for Rehabilitation in relation to preserving historic character; and it was amplified and modified in succeeding years to help guide preservation decisionmaking, initially for maintenance personnel in the National Park Service. A number of people contributed to the evolution of the ideas presented here. Special thanks go to Emogene Bevitt and Gary Hume, primarily for the many and frequent discussions relating to this approach in its evolutionary stages; to Mark Fram, Ontario Heritage Foundation, Toronto, for suggesting several additions to the Checklist; and more recently, to my co-workers, both in Washington and in our regional offices, especially Ward Jandl, Sara Blumenthal, Charles Fisher, Sharon Park, AIA, Jean Travers, Camille Martone, Susan Dynes, Michael Auer, Anne Grimmer, Kay Weeks, Betsy Chittenden, Patrick Andrus, Carol Shull, Hugh Miller, FAIA, Jerry Rogers, Paul Alley, David Look, AIA, Margaret Pepin-Donat, Bonnie Halda, Keith Everett, Thomas Keohan, the Preservation Services Division, Mid-Atlantic Region, and several reviewers in state preservation offices, especially Ann Haaker, Illinois; and Stan Graves, AIA, Texas; for providing very critical and constructive review of the manuscript.

This publication has been prepared pursuant to the National Historic Preservation Act of 1966, as amended. Comments on the usefulness of this information are welcomed and can be sent to Mr. Nelson, Preservation Assistance Division, National Park Service, U.S. Department of the Interior, P.O. Box 37127, Washington, D.C. 20013-7127. This publication is not copyrighted and can be reproduced without penalty. Normal procedures for credit to the author and the National Park Service are appreciated.

# 31 PRESERVATION BRIEFS

## Mothballing Historic Buildings

Sharon C. Park, AIA



U.S. Department of the Interior  
National Park Service  
Cultural Resources  
Heritage Preservation Services

When all means of finding a productive use for a historic building have been exhausted or when funds are not currently available to put a deteriorating structure into a useable condition, it may be necessary to close up the building temporarily to protect it from the weather as well as to secure it from vandalism. This process, known as mothballing, can be a necessary and effective means of protecting the building while planning the property's future, or raising money for a preservation, rehabilitation or restoration project. If a vacant property has been declared unsafe by building officials, stabilization and mothballing may be the only way to protect it from demolition.

This Preservation Brief focuses on the steps needed to "de-activate" a property for an extended period of time. The project team will usually consist of an architect, historian, preservation specialist, sometimes a structural engineer, and

a contractor. Mothballing should not be done without careful planning to ensure that needed physical repairs are made prior to securing the building. The steps discussed in this Brief can protect buildings for periods of up to ten years; long-term success will also depend on continued, although somewhat limited, monitoring and maintenance. For all but the simplest projects, hiring a team of preservation specialists is recommended to assess the specific needs of the structure and to develop an effective mothballing program.

A vacant historic building cannot survive indefinitely in a boarded-up condition, and so even marginal interim uses where there is regular activity and monitoring, such as a caretaker residence or non-flammable storage, are generally preferable to mothballing. In a few limited cases when the vacant building is in good condition and in a location where it can be watched and checked regularly, closing and locking the door, setting heat levels at just above freezing, and securing the windows may provide sufficient protection for a period of a few years. But if long-term mothballing is the only remaining option, it must be done properly (see fig. 1 & 2). This will require stabilization of the exterior, properly designed security protection, generally some form of interior ventilation - either through mechanical or natural air exchange systems - and continued maintenance and surveillance monitoring.

Comprehensive mothballing programs are generally expensive and may cost 10% or more of a modest rehabilitation budget. However, the money spent on well-planned protective measures will seem small when amortized over the life of the resource. Regardless of the location and condition of the property or the funding available, the following 9 steps are involved in properly mothballing a building:

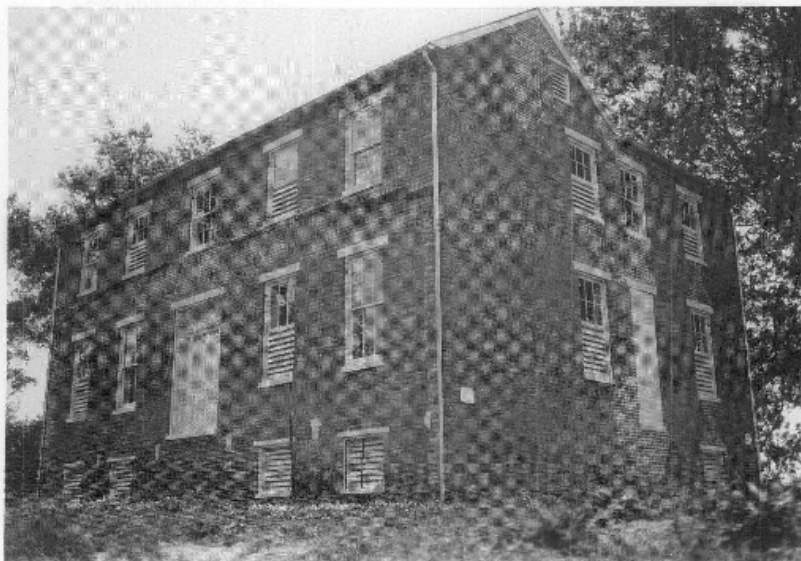


Figure 1. Proper mothballing treatment: This building has been successfully mothballed for 10 years because the roof and walls were repaired and structurally stabilized, ventilation louvers were added, and the property is maintained. Photo: Charles E. Fisher, NPS.

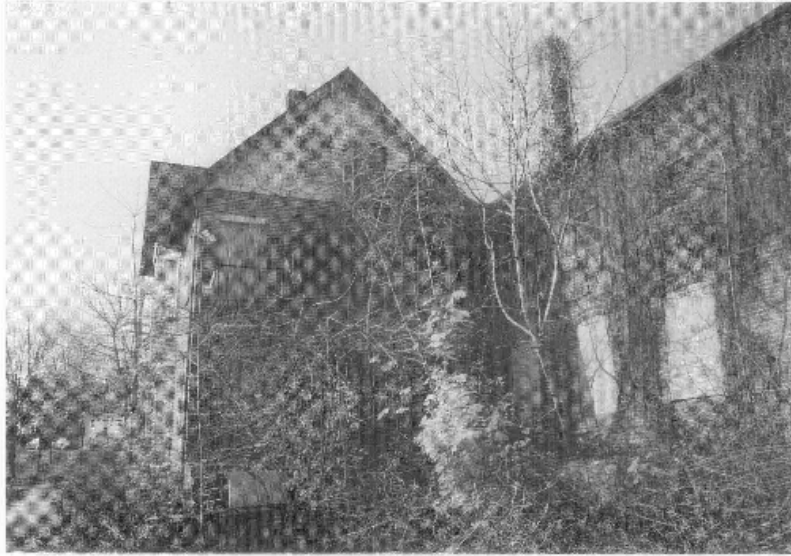


Figure 2. Improper treatment: Boarding up without adequate ventilation, lack of maintenance, and neglect of this property have accelerated deterioration. Photo; NPS file.

to be structurally unsound until the condition of the structure can be fully assessed (see fig. 3). If pigeon or bat droppings, friable asbestos or other health hazards are present, precautions must be taken to wear the appropriate safety equipment when first inspecting the building. Consideration should be given to hiring a firm specializing in hazardous waste removal if these highly toxic elements are found in the building.

**Documenting and recording the building.** Documenting a building's history is important because evidence of its true age and architectural significance may not be readily evident. The owner should check with the State Historic Preservation Office or local preservation commission for assistance in researching the building. If the building has never been researched for listing in the National Register of Historic Places or other historic registers, then, at a minimum, the following should be determined:

- The overall historical significance of the property and dates of construction;

the property and dates of construction;

- the chronology of alterations or additions and their approximate dates; and,
- types of building materials, construction techniques, and any unusual detailing or regional variations of craftsmanship.

Old photographs can be helpful in identifying early or original features that might be hidden under modern materials. On a walk-through, the architect, historian, or preservation specialist should identify the architecturally significant elements of the building, both inside and out (see fig.4).

#### Documentation

1. Document the architectural and historical significance of the building.
2. Prepare a condition assessment of the building.

#### Stabilization

3. Structurally stabilize the building, based on a professional condition assessment.
4. Exterminate or control pests, including termites and rodents.
5. Protect the exterior from moisture penetration.

#### Mothballing

6. Secure the building and its component features to reduce vandalism or break-ins.
7. Provide adequate ventilation to the interior.
8. Secure or modify utilities and mechanical systems.
9. Develop and implement a maintenance and monitoring plan for protection.

These steps will be discussed in sequence below. Documentation and stabilization are critical components of the process and should not be skipped over. Mothballing measures should not result in permanent damage, and so each treatment should be weighed in terms of its reversibility and its overall benefit.

#### Documentation

Documenting the historical significance and physical condition of the property will provide information necessary for setting priorities and allocating funds. The project team should be cautious when first entering the structure if it has been vacant or is deteriorated. It may be advisable to shore temporarily areas appearing

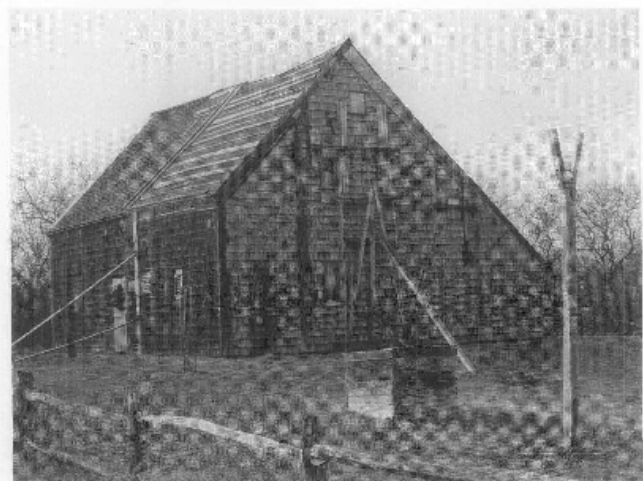


Figure 3. Buildings seriously damaged by storms or deterioration may need to be braced before architectural evaluations can be made. Jethro Coffin House. Photo: John Milner Architects.

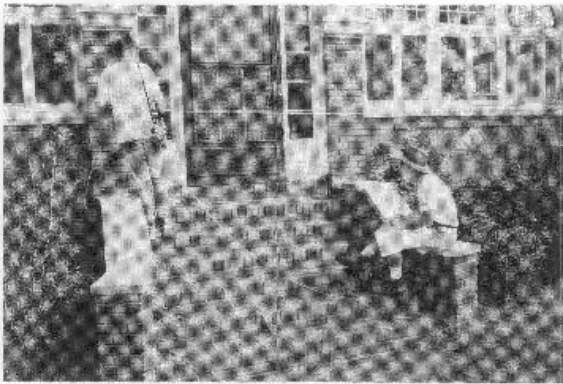


Figure 4. Documenting the building's history, preparing schematic plans, and assessing the condition of the building will provide necessary information on which to set priorities for stabilization and repair prior to securing the building. Photo: Frederick Lindstrom, HABS.

By understanding the history of the resource, significant elements, even though deteriorated, may be spared the trash pile. For that reason alone, any materials removed from the building or site as part of the stabilization effort should be carefully scrutinized and, if appearing historic, should be photographed, tagged with a number, inventoried, and safely stored, preferably in the building, for later retrieval (see fig. 5).

A site plan and schematic building floor plans can be used to note important information for use when the building is eventually preserved, restored, or rehabilitated. Each room should be given a number and notations added to the plans regarding the removal of important features to storage or recording physical treatments undertaken as part of the stabilization or repair.

Because a mothballing project may extend over a long period of time, with many different people involved, clear records should be kept and a building file established. Copies of all important data, plans, photographs, and lists of consultants or contractors who have worked on the property should be added to the file as the job progresses.

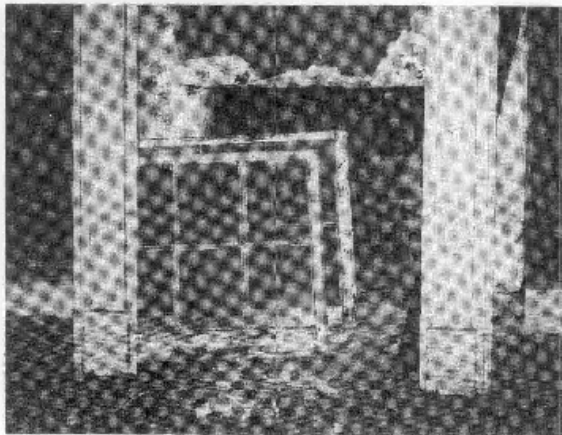


Figure 5. Loose or detached elements should be identified, tagged and stored, preferably on site. Photo: NPS files.

Recording all actions taken on the building will be helpful in the future.

The project coordinator should keep the building file updated and give duplicate copies to the owner. A list of emergency numbers, including the number of the key holder, should be kept at the entrance to the building or on a security gate, in a transparent vinyl sleeve.

**Preparing a condition assessment of the building.** A condition assessment can provide the owner with an accurate overview of the current condition of the property. If the building is deteriorated or if there are significant interior architectural elements that will need special protection during the mothballing years, undertaking a condition assessment is highly recommended, but it need not be exhaustive.

A modified condition assessment, prepared by an architect or preservation specialist, and in some case a structural engineer, will help set priorities for repairs necessary to stabilize the property for both the short and long-term. It will evaluate the age and condition of the following major elements: foundations; structural systems; exterior materials; roofs and gutters; exterior porches and steps; interior finishes; staircases; plumbing, electrical, mechanical systems; special features such as chimneys; and site drainage.

To record existing conditions of the building and site, it will be necessary to clean debris from the building and to remove unwanted or overgrown vegetation to expose foundations. The interior should be emptied of its furnishing (unless provisions are made for mothballing these as well), all debris removed, and the interior swept with a broom. Building materials too deteriorated to repair, or which have come detached, such as moldings, balusters, and decorative plaster, and which can be used to guide later preservation work, should be tagged, labeled and saved.

Photographs or a videotape of the exterior and all interior spaces of the resource will provide an invaluable record of "as is" conditions. If a videotape is made, oral commentary can be provided on the significance of each space and architectural feature. If 35mm photographic prints or slides are made, they should be numbered, dated, and appropriately identified. Photographs should be cross-referenced with the room numbers on the schematic plans. A systematic method for photographing should be developed; for example, photograph each wall in a room and then take a corner shot to get floor and ceiling portions in the picture. Photograph any unusual details as well as examples of each window and door type.

For historic buildings, the great advantage of a condition assessment is that architectural features, both on the exterior as well as the interior, can be rated on a scale of their importance to the integrity and significance of the building. Those features of the highest priority should receive preference when repairs or protection measures are outlined as part of the mothballing process. Potential problems with protecting these features should be identified so that appropriate interim solutions can be selected. For example, if a building has always been heated and if murals, decorative plaster walls, or examples of patterned wall paper are identified as highly significant, then special care should be taken to regulate the interior climate and to monitor it adequately during the

mothballing years. This might require retaining electrical service to provide minimal heat in winter, fan exhaust in summer, and humidity controls for the interior.

### Stabilization

Stabilization as part of a mothballing project involves correcting deficiencies to slow down the deterioration of the building while it is vacant. Weakened structural members that might fail altogether in the forthcoming years must be braced or reinforced; insects and other pests removed and discouraged from returning; and the building protected from moisture damage both by weatherizing the exterior envelope and by handling water run-off on the site. Even if a modified use or caretaker services can eventually be found for the building, the following steps should be addressed.

**Structurally stabilizing the building.** While bracing may have been required to make the building temporarily safe for inspection, the condition assessment may reveal areas of hidden structural damage. Roofs, foundations, walls, interior framing, porches and dormers all have structural components that may need added reinforcement. Structural stabilization by a qualified contractor should be done under the direction of a structural engineer or a preservation specialist to ensure that the added weight of the reinforcement can be sustained by the building and that the new members do not harm historic finishes (see fig. 6). Any major vertical post added during the stabilization should be properly supported and, if necessary, taken to the ground and underpinned.

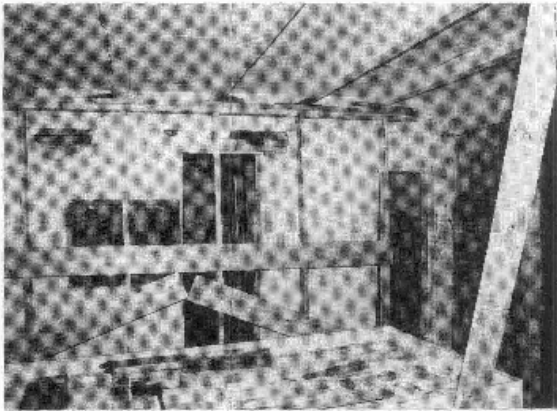


Figure 6. Interior bracing which will last the duration of the mothballing will protect weakened structural members. Jethro Coffin House. Photo: John Milner Architects.

If the building is in a northern climate, then the roof framing must be able to hold substantial snow loads. Bracing the roof at the ridge and mid-points should be considered if sagging is apparent. Likewise, interior framing around stair openings or under long ceiling spans should be investigated. Underpinning or bracing structural piers weakened by poor drainage patterns may be a good precaution as well. Damage caused by insects, moisture, or from other causes should be repaired or reinforced and, if possible, the source of the damage removed. If features such as porches and dormers are so severely deteriorated

that they must be removed, they should be documented, photographed, and portions salvaged for storage prior to removal.

If the building is in a southern or humid climate and termites or other insects are a particular problem, the foundation and floor framing should be inspected to ensure that there are no major structural weaknesses. This can usually be done by observation from the crawl space or basement. For those structures where this is not possible, it may be advisable to lift selective floor boards to expose the floor framing. If there is evidence of pest damage, particularly termites, active colonies should be treated and the structural members reinforced or replaced, if necessary.

**Controlling pests.** Pests can be numerous and include squirrels, raccoons, bats, mice, rats, snakes, termites, moths, beetles, ants, bees and wasps, pigeons, and other birds. Termites, beetles, and carpenter ants destroy wood. Mice, too, gnaw wood as well as plaster, insulation, and electrical wires. Pigeon and bat droppings not only damage wood finishes but create a serious and sometimes deadly health hazard.

If the property is infested with animals or insects, it is important to get them out and to seal off their access to the building. If necessary, exterminate and remove any nests or hatching colonies. Chimney flues may be closed off with exterior grade plywood caps, properly ventilated, or protected with framed wire screens. Existing vents, grills, and louvers in attics and crawl spaces should be screened with bug mesh or heavy duty wire, depending on the type of pest being controlled. It may be advantageous to have damp or infected wood treated with insecticides (as permitted by each state) or preservatives, such as borate, to slow the rate of deterioration during the time that the building is not in use.

**Securing the exterior envelope from moisture penetration.** It is important to protect the exterior envelope from moisture penetration before securing the building. Leaks from deteriorated or damaged roofing, from around windows and doors, or through deteriorated materials, as well as ground moisture from improper site run-off or rising damp at foundations, can cause long-term damage to interior finishes and structural systems. Any serious deficiencies on the exterior, identified in the condition assessment, should be addressed.

To the greatest extent possible, these weatherization efforts should not harm historic materials. The project budget may not allow deteriorated features to be fully repaired or replaced in-kind. Non-historic or modern materials may be used to cover historic surfaces temporarily, but these treatments should not destroy valuable evidence necessary for future preservation work. Temporary modifications should be as visually compatible as possible with the historic building.

Roofs are often the most vulnerable elements on the building exterior and yet in some ways they are the easiest element to stabilize for the long term, if done correctly. "Quick fix" solutions, such as tar patches on slate roofs, should be avoided as they will generally fail within a year or so and may accelerate damage by trapping moisture. They are difficult to undo later when more permanent repairs are undertaken. Use of a tarpaulin over a leaking roof should be thought of only as a very temporary



Figure 7. Non-historic materials are appropriate for mothballing projects when they are used to protect historic evidence remaining for future preservation. This lightweight aluminum channel frame and roofing covers the historic wooden shingle roof. Galvanized mesh panels secure the window openings from intrusion by raccoons and other unwanted guests. Photo: Williamsport Preservation Training Center, NPS.

emergency repair because it is often blown off by the wind in a subsequent storm.

If the existing historic roof needs moderate repairs to make it last an additional ten years, then these repairs should be undertaken as a first priority. Replacing cracked or missing shingles and tiles, securing loose flashing, and reanchoring gutters and downspouts can often be done by a local roofing contractor. If the roof is in poor condition, but the historic materials and configuration are important, a new temporary roof, such as a lightweight aluminum channel system over the existing, might be considered (see fig. 7). If the roofing is so deteriorated that it must be replaced and a lightweight aluminum system is not affordable, various inexpensive options might be considered. These include covering the existing deteriorated roof with galvanized corrugated metal roofing panels, or 90 lb. rolled roofing, or a rubberized membrane (refer back to cover photo). These alternatives should leave as much of the historic sheathing and roofing in place as evidence for later preservation treatments.

For masonry repairs, appropriate preservation approaches are essential. For example, if repointing deteriorated brick chimneys or walls is necessary to prevent serious moisture penetration while the building is mothballed, the mortar should match the historic mortar in composition, color, and tooling. The use of hard portland cement mortars or vapor-impermeable waterproof coatings are not appropriate solutions as they can cause extensive damage and are not reversible treatments (see fig. 8).

For wood siding that is deteriorated, repairs necessary to keep out moisture should be made; repainting is generally warranted. Cracks around windows and doors can be beneficial in providing ventilation to the interior and so should only be caulked if needed to keep out bugs and moisture. For very deteriorated wall surfaces on wooden frame structures, it may be necessary to sheathe in plywood panels, but care should be taken to minimize installation damage by planning the location of the nailing or screw



Figure 8. Appropriate mortar mixes should be used when masonry repairs are undertaken. In this case, a soft lime based mortar is used as an infill between the brick and wooden elements. When full repairs are made during the restoration phase, this soft mortar can easily be removed and missing bricks replaced.

patterns or by installing panels over a frame of battens (see fig. 9). Generally, however, it is better to repair deteriorated features than to cover them over.

Foundation damage may occur if water does not drain away from the building. Run-off from gutters and downspouts should be directed far away from the foundation wall by using long flexible extender pipes equal in length to twice the depth of the basement or crawl space. If underground drains are susceptible to clogging, it is recommended that the downspouts be disconnected from the drain boot and attached to flexible piping. If gutters and downspouts are in bad condition, replace them with inexpensive aluminum units.



Figure 9. Severely deteriorated wooden siding on a farm building has been covered over with painted plywood panels as a temporary measure to eliminate moisture penetration to the interior. Foundation vents and loose floor boards allow air to circulate inside.



If there are no significant landscape or exposed archeological elements around the foundation, consideration should be given to regrading the site if there is a documented drainage problem (see fig. 10). If building up the grade, use a fiber mesh membrane to separate the new soil from the old and slope the new soil 6 to 8 feet (200 cm-266 cm) away from the foundation making sure not to cover up the dampcourse layer or come into contact with skirting boards. To keep vegetation under control, put down a layer of 6 mil black polyethylene sheeting or fiber mesh matting covered with a 2"-4" (5-10 cm.) of washed gravel. If the building suffers a serious rising damp problem, it may be advisable to eliminate the plastic sheeting to avoid trapping ground moisture against foundations.

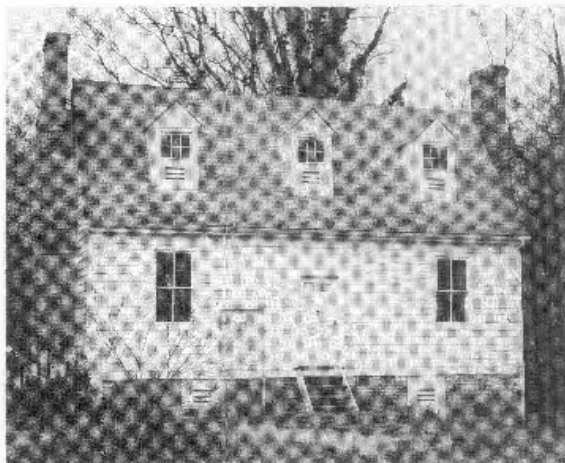


Figure 10. Regrading around the Booker Tenement at Colonial Williamsburg has protected the masonry foundation wall from excessive damp. This building has been successfully mothballed for over 10 years. Note the attic and basement vents, the temporary stairs, and the informative sign interpreting the history of this building.

### Mothballing

The actual mothballing effort involves controlling the long-term deterioration of the building while it is unoccupied as well as finding methods to protect it from sudden loss by fire or vandalism. This requires securing the building from unwanted entry, providing adequate ventilation to the interior, and shutting down or modifying existing utilities. Once the building is de-activated or secured, the long-term success will depend on periodic maintenance and surveillance monitoring.

**Securing the building from vandals, break-ins, and natural disasters.** Securing the building from sudden loss is a critical aspect of mothballing. Because historic buildings are irreplaceable, it is vital that vulnerable entry points are sealed. If the building is located where fire and security service is available then it is highly recommended that some form of monitoring or alarm devices be used.

To protect decorative features, such as mantels, lighting fixtures, copper downspouts, iron roof cresting, or stained glass windows from theft or vandalism, it may be advisable to temporarily remove them to a more secure location if they cannot be adequately protected within the structure.

Mothballed buildings are usually boarded up, particularly on the first floor and basement, to protect fragile glass windows from breaking and to reinforce entry points (see fig. 11). Infill materials for closing door and window openings include plywood, corrugated panels, metal grates, chain fencing, metal grills, and cinder or cement blocks (see fig. 12). The method of installation should not result in the destruction of the opening and all associated sash, doors, and frames should be protected or stored for future reuse.



Figure 11. Urban buildings often need additional protection from unwanted entry and graffiti. This commercial building uses painted plywood panels to cover expansive glass storefronts and chain link fencing is applied on top of the panels. The upper windows on the street sides have been covered and painted to resemble 19th century sash. Photo: Thomas Jester, NPS.

Generally exterior doors are reinforced and provided with strong locks, but if weak historic doors would be damaged or disfigured by adding reinforcement or new locks, they may be removed temporarily and replaced with secure modern doors (see fig. 13). Alternatively, security gates in a new metal frame can be installed within existing door openings, much like a storm door, leaving the historic door in place. If plywood panels are installed over door openings, they should be screwed in place, as opposed to nailed, to avoid crowbar damage each time the panel is removed. This also reduces pounding vibrations from hammers and eliminates new nail holes each time the panel is replaced.

For windows, the most common security feature is the closure of the openings; this may be achieved with wooden or pre-formed panels or, as needed, with metal sheets or concrete blocks. Plywood panels, properly installed to protect wooden frames and properly ventilated, are the preferred treatment from a preservation standpoint.

There are a number of ways to set insert plywood panels into window openings to avoid damage to frame and sash (see fig. 14). One common method is to bring the upper and lower sash of a double hung unit to the mid-point of the opening and then to install pre-cut plywood panels using long carriage bolts anchored into horizontal wooden bracing, or strong backs, on the inside face of the window. Another means is to build new wooden blocking frames set into deeply recessed openings, for example in an industrial mill or warehouse, and then to affix the plywood panel to

the blocking frame. If sash must be removed prior to installing panels, they should be labeled and stored safely within the building.

Plywood panels are usually 1/2"-3/4" (1.25-1.875 cm.) thick and made of exterior grade stock, such as CDX, or

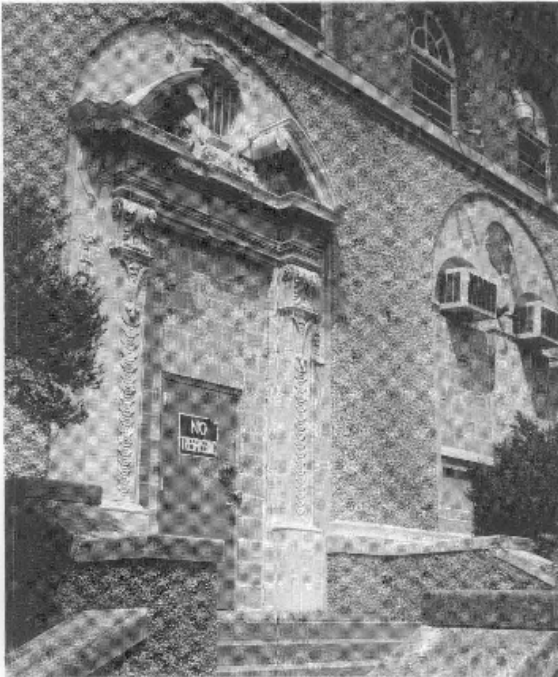


Figure 12. First floor openings have been filled with cinderblocks and doors, window sash and frames have been removed for safe keeping. Note the security light over the windows and the use of a security metal door with heavy duty locks. Photo: H. Ward Jandt, NPS.

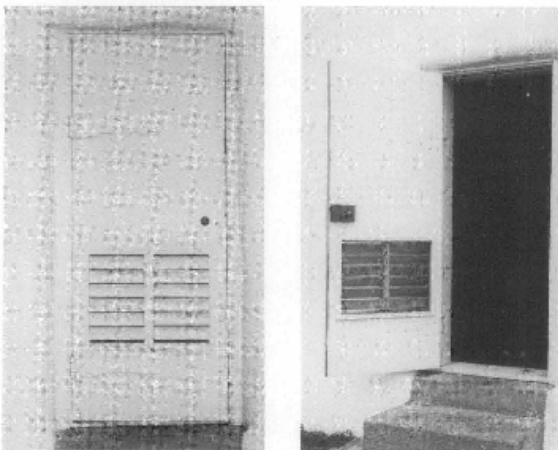


Figure 13. If historic doors would be damaged by adding extra locks, they should be removed and stored and new security doors added. At this lighthouse, the historic door has been replaced with a new door (seen both inside and outside) with an inset vent and new deadbolt locks. The heavy historic hinges have not been damaged. Photo: Williamsport Preservation Training Center, NPS.

marine grade plywood. They should be painted to protect them from delamination and to provide a neater appearance. These panels may be painted to resemble operable windows or treated decoratively (see fig. 15). With extra attention to detail, the plywood panels can be

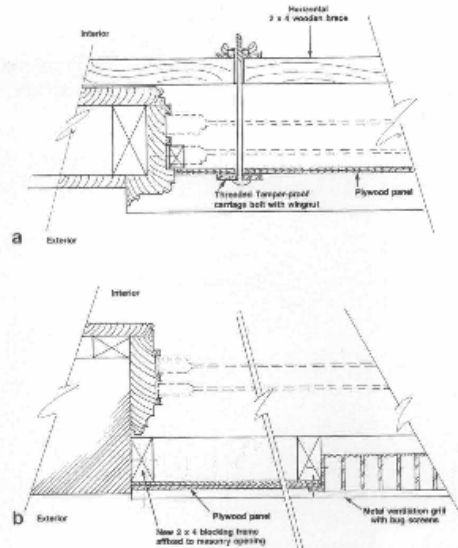


Figure 14. A: Plan detail showing plywood security panel anchored with carriage bolts through to the inside horizontal bracing, or strong backs. B: Plan detail showing section of plywood window panel attached to a new pressure treated wood frame set within the masonry opening. Ventilation should be included whenever possible or necessary.

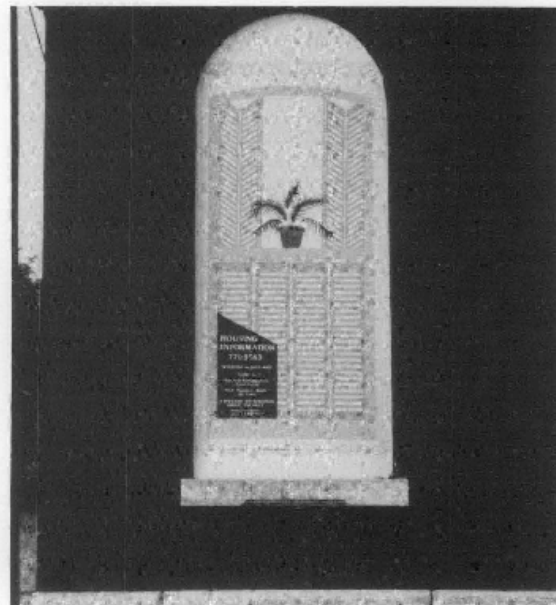


Figure 15. Painting trompe l'oeil scenes on plywood panels is a neighborhood friendly device. In addition, the small sign at the bottom left corner gives information for contacting the organization responsible for the care of the mothballed building. Photo: Lee H. Nelson, FAIA.

trimmed out with muntin strips to give a shadow line simulating multi-lite windows. This level of detail is a good indication that the building is protected and valued by the owner and the community.

If the building has shutters, simply close the shutters and secure them from the interior (see fig. 16). If the building had shutters historically, but they are missing, it may be appropriate to install new shutters, even in a modern material, and secure them in the closed position. Louvered shutters will help with interior ventilation if the sash are propped open behind the shutters.

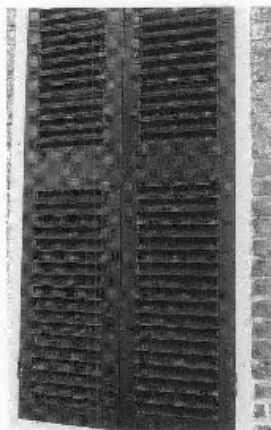


Figure 16. Historic louvered shutters make excellent security closures with passive ventilation.

There is some benefit from keeping windows unboarded if security is not a problem. The building will appear to be occupied, and the natural air leakage around the windows will assist in ventilating the interior. The presence of natural light will also help when periodic inspections are made. Rigid polycarbonate clear storm glazing panels may be placed on the window exterior to protect against glass breakage. Because the sun's ultraviolet rays can cause fading of floor finishes and wall surfaces, filtering pull shades or inexpensive curtains may be options for reducing this type of deterioration for significant interiors. Some acrylic sheeting comes with built-in ultraviolet filters.

Securing the building from catastrophic destruction from fire, lightning, or arson will require additional security devices. Lightning rods properly grounded should be a first consideration if the building is in an area susceptible to lightning storms. A high security fence should also be installed if the property cannot be monitored closely. These interventions do not require a power source for operation. Since many buildings will not maintain electrical power, there are some devices available using battery packs, such as intrusion alarms, security lighting, and smoke detectors which through audible horn alarms can alert nearby neighbors. These battery packs must be replaced every 3 months to 2 years, depending on type and usage. In combination with a cellular phone, they can also provide some level of direct communication with police and fire departments.

If at all possible, new temporary electric service should be provided to the building (see fig. 17). Generally a telephone

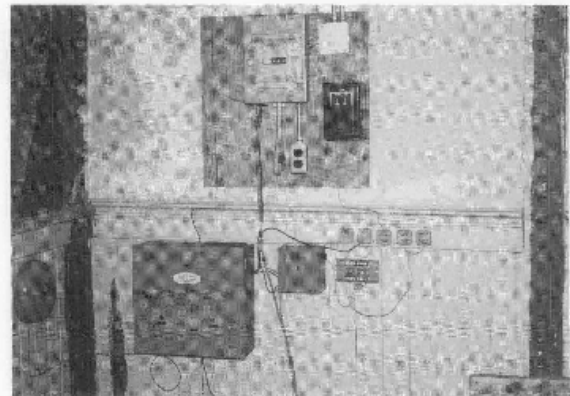


Figure 17. Security systems are very important for mothballed buildings if they are located where fire and security services are available. A temporary electric service with battery back-up has been installed in this building. Intrusion alarms and ionization smoke/fire detectors are wired directly to the nearby security service.

line is needed as well. A hard wired security system for intrusion and a combination rate-of-rise and smoke detector can send an immediate signal for help directly to the fire department and security service. Depending on whether or not heat will be maintained in the building, the security system should be designed accordingly. Some systems cannot work below 32°F (0°C). Exterior lighting set on a timer, photo electric sensor, or a motion/infrared detection device provides additional security.

**Providing adequate ventilation to the interior.** Once the exterior has been made weathertight and secure, it is essential to provide adequate air exchange throughout the building. Without adequate air exchange, humidity may rise to unsafe levels, and mold, rot, and insect infestation are likely to thrive (see fig. 18). The needs of each historic resource must be individually evaluated because there are so many variables that affect the performance of each interior space once the building has been secured. A

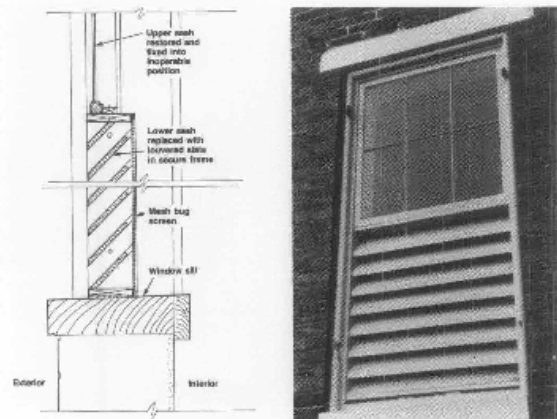


Figure 18. Heavy duty wooden slated louvers were custom fabricated to replace the deteriorated lower sash. The upper sash were rebuilt to retain the historic appearance and to allow light into this vacant historic building. Refer back to Fig. 1 for a view of the building. Photo: Charles E. Fisher, NPS. Drawing by Thomas Vitanza.

mechanical engineer or a specialist in interior climates should be consulted, particularly for buildings with intact and significant interiors. In some circumstances, providing heat during the winter, even at a minimal 45° F (7°C), and utilizing forced-fan ventilation in summer will be recommended and will require retaining electrical service. For masonry buildings it is often helpful to keep the interior temperature above the spring dew point to avoid damaging condensation. In most buildings it is the need for summer ventilation that outweighs the winter requirements.

Many old buildings are inherently leaky due to loose-fitting windows and floorboards and the lack of insulation. The level of air exchange needed for each building, however, will vary according to geographic location, the building's construction, and its general size and configuration.

There are four critical climate zones when looking at the type and amount of interior ventilation needed for a closed up building: hot and dry (southwestern states); cold and damp (Pacific northwest and northeastern states); temperate and humid (Mid-Atlantic states, coastal areas); and hot and humid (southern states and the tropics). (See fig. 19 for a chart outlining guidance on ventilation.)

Once closed up, a building interior will still be affected by the temperature and humidity of the exterior. Without proper ventilation, moisture from condensation may occur and cause damage by wetting plaster, peeling paint,

staining woodwork, warping floors, and in some cases even causing freeze thaw damage to plaster. If moist conditions persist in a property, structural damage can result from rot or returning insects attracted to moist conditions. Poorly mothballed masonry buildings, particularly in damp and humid zones have been so damaged on the interior with just one year of unventilated closure that none of the interior finishes were salvageable when the buildings were rehabilitated.

The absolute minimum air exchange for most mothballed buildings consists of one to four air exchanges every hour; one or two air exchanges per hour in winter and often twice that amount in summer. Even this minimal exchange may foster mold and mildew in damp climates, and so monitoring the property during the stabilization period and after the building has been secured will provide useful information on the effectiveness of the ventilation solution.

There is no exact science for how much ventilation should be provided for each building. There are, however, some general rules of thumb. Buildings, such as adobe structures, located in hot and arid climates may need no additional ventilation if they have been well weatherized and no moisture is penetrating the interior. Also frame buildings with natural cracks and fissures for air infiltration may have a natural air exchange rate of 3 or 4 per hour, and so in arid as well as temperate climates may need no additional ventilation once secured. The most difficult

VENTILATION GUIDANCE CHART								
CLIMATE	AIR EXCHANGES		VENTILATION					
	Winter air exchange per hour	Summer air exchange per hour	Frame Buildings passive louvering		Masonry Buildings passive louvering		Masonry Buildings fan combination	
			% of openings louvered	% of openings louvered	% of openings louvered	% of openings louvered	one fan + % louvered	
		winter	summer	winter	summer	summer		
<b>hot and dry</b> Southwestern areas	less than 1	less than 1	N/A	N/A	N/A	N/A	N/A	N/A
<b>cold and damp</b> Northeastern & Pacific northwestern areas	1	2-3	5%	10%	10%	30%		20%
<b>temperate/humid</b> Mid-Atlantic & coastal areas	2	3-4	10%	20%	20%	40%		30%
<b>hot and humid</b> Southern states & tropical areas	3	4 or more	20%	30%	40% or more	80%		40% or more

Figure 19. This is a general guide for the amount of louvering which might be expected for a medium size residential structure with an average amount of windows, attic, and crawl space ventilation. There is currently research being done on effective air exchanges, but each project should be evaluated individually. It will be noticed from the chart that summer louvering requirements can be reduced with the use of an exhaust fan. Masonry buildings need more ventilation than frame buildings. Chart prepared by Sharon C. Park, AIA and Ernest A. Conrad, PE.

buildings to adequately ventilate without resorting to extensive louvering and/or mechanical exhaust fan systems are masonry buildings in humid climates. Even with basement and attic vent grills, a masonry building may not have more than one air exchange an hour. This is generally unacceptable for summer conditions. For these buildings, almost every window opening will need to be fitted out with some type of passive, louvered ventilation.

Depending on the size, plan configuration, and ceiling heights of a building, it is often necessary to have louvered opening equivalent to 5%-10% of the square footage of each floor. For example, in a humid climate, a typical 20'x30' (6.1m x 9.1m) brick residence with 600 sq. ft.(55.5 sq.m) of floor space and a typical number of windows, may need 30-60 sq. ft.(2.75sq.m-5.5 sq. m) of louvered openings per floor. With each window measuring 3'x5'(.9m x 1.5 m) or 15 sq. ft. (1.3 sq.m), the equivalent of 2 to 4 windows per floor may need full window louvers.

Small pre-formed louvers set into a plywood panel or small slit-type registers at the base of inset panels generally cannot provide enough ventilation in most moist climates to offset condensation, but this approach is certainly better than no louvers at all. Louvers should be located to give cross ventilation, interior doors should be fixed ajar at least 4" (10cm) to allow air to circulate, and hatches to the attic should be left open.

Monitoring devices which can record internal temperature and humidity levels can be invaluable in determining if the internal climate is remaining stable. These units can be powered by portable battery packs or can be wired into electric service with data downloaded into laptop computers periodically (see fig. 20). This can also give long-term information throughout the mothballing years. If it is determined that there are inadequate air exchanges to keep interior moisture levels under control, additional passive ventilation can be increased, or, if there is electric service, mechanical exhaust fans can be installed. One fan in a small to medium sized building can reduce the amount of louvering substantially.

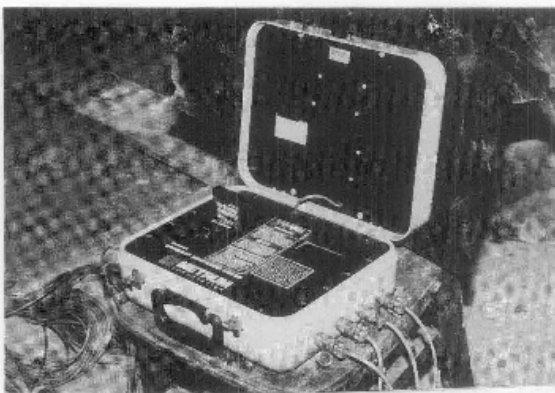


Figure 20. Portable monitors used to record temperature and humidity conditions in historic buildings during mothballing can help identify ventilation needs. This data can be downloaded directly into a lap top computer on site. These monitors are especially helpful over the long term for buildings with significant historic interiors or which are remaining furnished. If interiors are remaining damp or humid, additional ventilation should be added or the source of moisture controlled.

If electric fans are used, study the environmental conditions of each property and determine if the fans should be controlled by thermostats or automatic timers.

Humidistats, designed for enclosed climate control systems, generally are difficult to adapt for open mothballing conditions. How the system will draw in or exhaust air is also important. It may be determined that it is best to bring dry air in from the attic or upper levels and force it out through lower basement windows (see fig. 21). If the basement is damp, it may be best to zone it from the rest of the building and exhaust its air separately. Additionally, less humid day air is preferred over damper night air, and this can be controlled with a timer switch mounted to the fan.

The type of ventilation should not undermine the security of the building. The most secure installations use custom-made grills well anchored to the window frame, often set in plywood security panels. Some vents are formed using heavy millwork louvers set into existing window openings (refer back to fig.18). For buildings where security is not a primary issue, where the interior is modest, and where there has been no heat for a long time, it may be possible to use lightweight galvanized metal grills in the window openings (refer back to fig.7). A cost effective grill can be made from the expanded metal mesh lath used by plasterers and installed so that the mesh fins shed rainwater to the exterior.

**Securing mechanical systems and utilities.** At the outset, it is important to determine which utilities and services, such as electrical or telephone lines, are kept and which are cut off. As long as these services will not constitute a fire

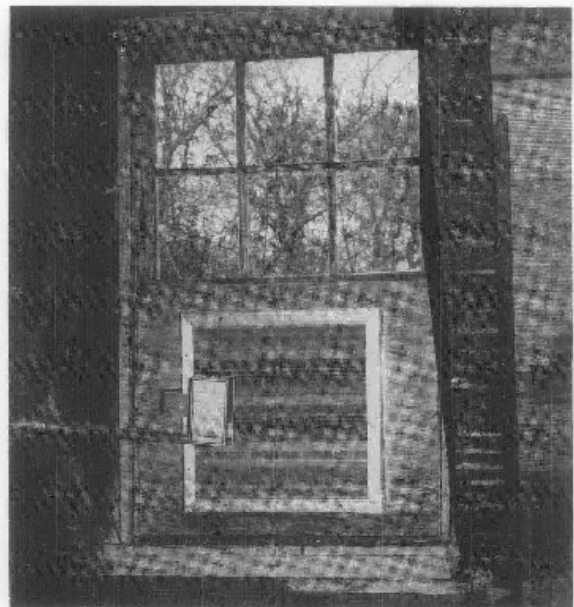


Figure 21. This electric thermostat/humidistat mounted in the attic vent controls a modified ducted air/fan system. The unit uses temporary exposed sheet metal ducts to pull air through the building and exhaust it out of the basement. For over ten years this fan system in combination with 18" x 18" preformed louvers in selective windows has kept the interior dry and with good air exchanges.

hazard, it is advisable to retain those which will help protect the property. Since the electrical needs will be limited in a vacant building, it is best to install a new temporary electric line and panel (100 amp) so that all the wiring is new and exposed. This will be much safer for the building, and allows easy access for reading the meter (see fig. 22).

Most heating systems are shut down in long term mothballing. For furnaces fueled by oil, there are two choices for dealing with the tank. Either it must be filled to the top with oil to eliminate condensation or it should be drained. If it remains empty for more than a year, it will likely rust and not be reusable. Most tanks are drained if a newer type of system is envisioned when the building is put back into service. Gas systems with open flames should be turned off unless there is regular maintenance and frequent surveillance of the property. Gas lines are shut off by the utility company.

If a hot water radiator system is retained for low levels of heat, it generally must be modified to be a self-contained system and the water supply is capped at the meter. This



Figure 22. All systems except temporary electric have been shut off at this residence which has been mothballed over 20 years. An electric meter and 100 amp panel box have been set on a plywood panel at the front of the building. It is used for interior lighting and various alarm systems. The building, however, is showing signs of moisture problems with efflorescent stains on the masonry indicating the need for gutter maintenance and additional ventilation for the interior. The vegetation on the walls, although picturesque, traps moisture and is damaging to the masonry. Photo: H. Ward Jandl, NPS.

recirculating system protects the property from extensive damage from burst pipes. Water is replaced with a water/glycol mix and the reserve tank must also be filled with this mixture. This keeps the modified system from freezing, if there is a power failure. If water service is cut off, pipes should be drained. Sewerage systems will require special care as sewer gas is explosive. Either the traps must be filled with glycol or the sewer line should be capped off at the building line.

**Developing a maintenance and monitoring plan.** While every effort may have been made to stabilize the property and to slow the deterioration of materials, natural disasters, storms, undetected leaks, and unwanted intrusion can still occur. A regular schedule for surveillance, maintenance, and monitoring should be established: (See fig. 23 for maintenance chart).

<b>MAINTENANCE CHART</b>	
<b>periodic</b>	
<input type="checkbox"/>	regular drive by surveillance
<input type="checkbox"/>	check attic during storms if possible
<b>monthly walk arounds</b>	
<input type="checkbox"/>	check entrances
<input type="checkbox"/>	check window panes for breakage
<input type="checkbox"/>	mowing as required
<input type="checkbox"/>	check for graffiti or vandalism
<b>enter every 3 months to air out</b>	
<input type="checkbox"/>	check for musty air
<input type="checkbox"/>	check for moisture damage
<input type="checkbox"/>	check battery packs and monitoring equipment
<input type="checkbox"/>	check light bulbs
<input type="checkbox"/>	check for evidence of pest intrusion
<b>every 6 months; spring and fall</b>	
<input type="checkbox"/>	site clean-up; pruning and trimming
<input type="checkbox"/>	gutter and downspout check
<input type="checkbox"/>	check crawlspace for pests
<input type="checkbox"/>	clean out storm drains
<b>every 12 months</b>	
<input type="checkbox"/>	maintenance contract inspections for equipment/utilities
<input type="checkbox"/>	check roof for loose or missing shingles
<input type="checkbox"/>	termite and pest inspection/treatment
<input type="checkbox"/>	exterior materials spot repair and touch up painting
<input type="checkbox"/>	remove bird droppings or other stains from exterior
<input type="checkbox"/>	check and update building file

Figure 23. Maintenance Chart. Many of the tasks on the maintenance chart can be done by volunteer help or service contracts. Regular visits to the site will help detect intrusion, storm damage, or poor water drainage.

The fire and police departments should be notified that the property will be vacant. A walk-through visit to familiarize these officials with the building's location, construction materials, and overall plan may be invaluable if they are called on in the future.

The optimum schedule for surveillance visits to the property will depend on the location of the property and the number of people who can assist with these activities. The more frequent the visits to check the property, the sooner that water leaks or break-ins will be noticed. Also, the more frequently the building is entered, the better the air exchange. By keeping the site clear and the building in good repair, the community will know that the building has not been abandoned (see fig. 24). The involvement of neighbors and community groups in caring for the property can ensure its protection from a variety of catastrophic circumstances.

The owner may utilize volunteers and service companies to undertake the work outlined in the maintenance chart.

Service companies on a maintenance contract can provide yard, maintenance, and inspection services, and their reports or itemized bills reflecting work undertaken should be added to update the building file.



Figure 24. Once mothballed, a property must still be monitored and maintained. The openings in this historic barn have been modified with a combination of wood lowers and metal mesh panels which require little maintenance. The grounds are regularly mowed, even inside the chain link security fence. Photo: Williamsport Preservation Training Center, NPS.

### Components of a Mothballing Project

**Document:** Brearley House, New Jersey; 2½ story center hall plan house contains a high degree of integrity of circa 1761 materials and significant early 19th century additions. Deterioration was attributable to leaking roof, unstable masonry at gables and chimneys, deteriorating attic windows, poor site drainage, and partially detached gutters. Mothballing efforts are required for approximately 7-10 years.

**Stabilize:** Remove bat droppings from attic using great caution. Secure historic chimneys and gable ends with plywood panels. Do not take historic chimneys down. Reroof with asphalt shingles and reattach or add new gutters and downspouts. Add extenders to downspouts. Add bug screens to any ventilation areas. Add soil around foundation and slope to gain positive drain; do not excavate as this will disturb archeological evidence.

**Mothball:** Install security fence around the property. Secure doors and windows with plywood panels (½" exterior grade). Install preformed metal grills in basement and attic openings. Add surface mounted wiring for ionization smoke and fire detection with direct wire to police and fire departments. Shut off heat and drain pipes. Add window exhaust fan set on a thermostatic control. Provide for periodic monitoring and maintenance of the property.

Figure 25. Above is a summary of the tasks that were necessary in order to protect this significant property while restoration funds are raised. Photographs: Michael Mills; Ford Farewell Mills Gatsch Architects.



a. A view showing the exterior of the house in its mothballed condition.



b. Plywood panels stabilize the chimneys. Note the gable vents.



c. The exhaust fan has tamper-proof housing.

<b>MOTHBALLING CHECKLIST</b>			
<b>Mothballing Checklist</b> In reviewing mothballing plans, the following checklist may help to ensure that work items are not inadvertently omitted.	Yes	No	Date of action or comment.
<p><i>Moisture</i></p> <ul style="list-style-type: none"> <li>• Is the roof watertight?</li> <li>• Do the gutters retain their proper pitch and are they clean?</li> <li>• Are downspout joints intact?</li> <li>• Are drains unobstructed?</li> <li>• Are windows and doors and their frames in good condition?</li> <li>• Are masonry walls in good condition to seal out moisture?</li> <li>• Is wood siding in good condition?</li> <li>• Is site properly graded for water run-off?</li> <li>• Is vegetation cleared from around the building foundation to avoid trapping moisture?</li> </ul>			
<p><i>Pests</i></p> <ul style="list-style-type: none"> <li>• Have nests/pests been removed from the building's interior and eaves?</li> <li>• Are adequate screens in place to guard against pests?</li> <li>• Has the building been inspected and treated for termites, carpenter ants, and rodents?</li> <li>• If toxic droppings from bats and pigeons are present, has a special company been brought in for its disposal?</li> </ul>			
<p><i>Housekeeping</i></p> <ul style="list-style-type: none"> <li>• Have the following been removed from the interior: trash, hazardous materials such as inflammable liquids, poisons, and paints and canned goods that could freeze and burst?</li> <li>• Is the interior broom-clean?</li> <li>• Have furnishings been removed to a safe location?</li> <li>• If furnishings are remaining in the building, are they properly protected from dust, pests, ultraviolet light, and other potentially harmful problems?</li> <li>• Have significant architectural elements that have become detached from the building been labeled and stored in a safe place?</li> <li>• Is there a building file?</li> </ul>			
<p><i>Security</i></p> <ul style="list-style-type: none"> <li>• Have fire and police departments been notified that the building will be mothballed?</li> <li>• Are smoke and fire detectors in working order?</li> <li>• Are the exterior doors and windows securely fastened?</li> <li>• Are plans in place to monitor the building on a regular basis?</li> <li>• Are the keys to the building in a secure but accessible location?</li> <li>• Are the grounds being kept from becoming overgrown?</li> </ul>			
<p><i>Utilities</i></p> <ul style="list-style-type: none"> <li>• Have utility companies disconnected/shut off or fully inspected water, gas, and electric lines?</li> <li>• If the building will not remain heated, have water pipes been drained and glycol added?</li> <li>• If the electricity is to be left on, is the wiring in safe condition?</li> </ul>			
<p><i>Ventilation</i></p> <ul style="list-style-type: none"> <li>• Have steps been taken to ensure proper ventilation of the building?</li> <li>• Have interior doors been left open for ventilation purposes?</li> <li>• Has the secured building been checked within the last 3 months for interior dampness or excessive humidity?</li> </ul>			

Figure 26.. MOTHBALL CHECKLIST. This checklist will give the building owner or manager a handy reference guide to items that should be addressed when mothballing a historic building. Prepared by H. Ward Jandl, NPS.



## Conclusion

Providing temporary protection and stabilization for vacant historic buildings can arrest deterioration and buy the owner valuable time to raise money for preservation or to find a compatible use for the property. A well planned mothballing project involves documenting the history and condition of the building, stabilizing the structure to slow down its deterioration, and finally mothballing the structure to secure it (See fig. 25). The three highest priorities for the building while it is mothballed are 1) to protect the building from sudden loss, 2) to weatherize and maintain the property to stop moisture penetration, and 3) to control the humidity levels inside once the building has been secured. See Mothballing Checklist Figure 26.

While issues regarding mothballing may seem simple, the variables and intricacies of possible solutions make the decision-making process very important. Each building must be individually evaluated prior to mothballing. In addition, a variety of professional services as well as volunteer assistance are needed for careful planning and repair, sensitively designed protection measures, follow-up security surveillance, and cyclical maintenance (see fig. 27).

In planning for the future of the building, complete and systematic records must be kept and generous funds allocated for mothballing. This will ensure that the historic property will be in stable condition for its eventual preservation, rehabilitation, or restoration.

## Acknowledgements

This publication has been prepared pursuant to the National Historic Preservation Act of 1966, as amended, which directs the Secretary of the Interior to develop and make available information concerning historic properties. Comments on the usefulness of this publication may be directed to H. Ward Jandl, Deputy Chief, Preservation Assistance Division, National Park Service, P.O. Box 37127, Washington, D.C. 20013-7127. This publication is not copyrighted and can be reproduced without penalty. Normal procedures for credit to the author and the National Park Service are appreciated.

The author, Sharon C. Park, Senior Historical Architect, Preservation Assistance Division, National Park Service, would like to acknowledge the assistance of the following individuals in the preparation and review of this publication. H. Ward Jandl served as the technical editor and assisted with producing this Preservation Brief. In addition the following persons have provided invaluable information and illustrations: Ernest A. Conrad, PE; Doug Hicks, NPS Williamsport Preservation Training Center; Thomas C. Taylor, Colonial Williamsburg; Karen Gordon, Seattle Urban Conservation Office; Kevin B. Stoops, Seattle Department of Parks and Recreation; Michael Mills, AIA; Christine Henry, architect, Mary Beth Hirsch, Ohio Historical Society. Thanks also to Preservation Assistance Division staff members Michael J. Auer, Anne E. Grimmer, Kay D. Weeks, Timothy A. Buehner, and Jean Travers, and to the numerous staff members of the NPS Regional offices who submitted comments.

All photographs and drawings are by the author unless otherwise noted.

Cover photograph: Mothballing of this historic house involved a new membrane roof covering over the historic roof and slatted window covers for security and ventilation. Photo: Williamsport Preservation Training Center, NPS.

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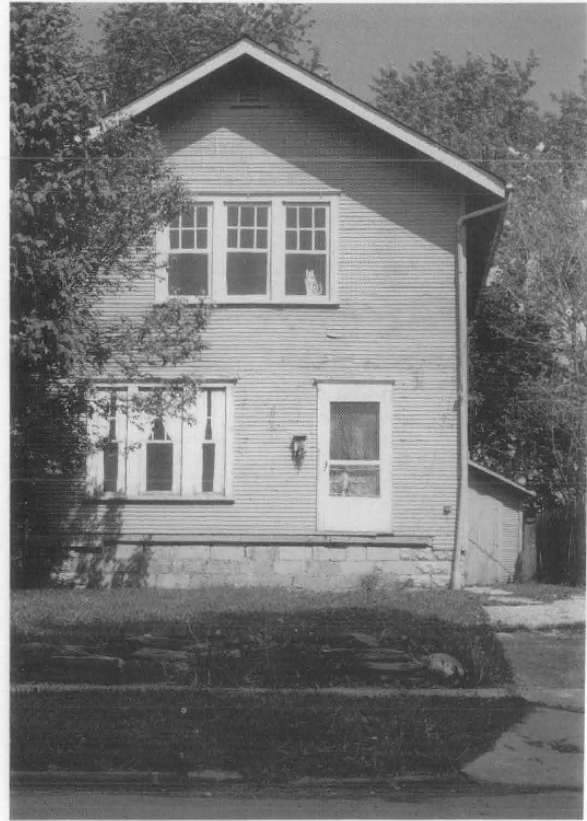


Figure 27. This residential building blends into its neighborhood even though all the windows have been covered over and the front steps are missing. The grounds are maintained and the special attention to decoratively painting the window panels shows that the property is being well cared for until it can be rehabilitated. Photo: Ohio Historical Society.

## Further Reading

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Solon, Thomas E. "Security Panels for the Foster-Armstrong House." *Association for Preservation Technology Bulletin*. Vol XVI no. 3 & 4, 1984. (note the design of the panels, but be aware that additional louvering may be needed on other projects).

# 35 PRESERVATION BRIEFS

## Understanding Old Buildings: The Process of Architectural Investigation

Travis C. McDonald, Jr.



U.S. Department of the Interior  
National Park Service  
Cultural Resources  
Heritage Preservation Services



If you have ever felt a sense of excitement and mystery going inside an old building—whether occupied or vacant—it is probably because its materials and features resonate with the spirit of past people and events. Yet excitement about the unknown is heightened when a historic structure is examined architecturally, and its evolution over time emerges with increasing clarity to reveal the lives of its occupants. Architectural investigation is the critical first step in planning an appropriate treatment—understanding how a building has changed over time and assessing levels of deterioration.

Whether as a home owner making sympathetic repairs, a craftsman or contractor replacing damaged or missing features, or a conservator reconstituting wood or restoring decorative finishes, some type of investigative skill was used to recognize and solve an architectural question or explain a difficult aspect of the work itself.

To date, very little has been written for the layman on the subject of architectural investigation. This Preservation Brief thus addresses the often complex investigative process in broad, easy-to-understand terminology. The logical sequence of planning, investigation and analysis presented in this Brief is applicable to all buildings, geographic locations, periods, and construction types. It is neither a “how to” nor an exhaustive study on techniques or methodologies; rather, it serves to underscore the need for meticulous planning prior to work on our irreplaceable cultural resources.

### Determining the Purpose of Investigation

Both the purpose and scope of investigation need to be determined before formulating a particular approach. For example, investigation strictly for research purposes could produce information for an architectural survey or for an historic designation application at the local, state or national level.

Within the framework of *The Secretary of the Interior’s Standards for the Treatment of Historic Properties*, investigation is crucial for “identifying, retaining, and preserving the form and detailing of those architectural materials and features that are important in defining the

historic character” of a property, whether for repair or replacement. A rehabilitation project, for instance, might require an investigation to determine the historic configuration of interior spaces prior to partitioning a room to meet a compatible new use. Investigation for preservation work can entail more detailed information about an entire building, such as determining the physical sequence of construction to aid in interpretation. Investigation for a restoration project must be even more comprehensive in order to re-capture the exact form, features, finishes, and detailing of every component of the building.

Whether investigation will be undertaken by professionals—architects, conservators, historians—or by interested homeowners, the process is essentially comprised of a preliminary four-step procedure: historical research, documentation, inventory, and stabilization.

**Historical Research.** Primary historical research of an old building generally encompasses written, visual and oral resources that can provide valuable site-specific information. Written resources usually include letters, legal transactions, account books, insurance policies, institutional papers, and diaries. Visual resources consist of drawings, maps, plans, paintings and photographs. Oral resources are people’s remembrances of the past. Secondary resources, comprised of research or history already compiled and written about a subject, are also important for providing a broad contextual setting for a project.

Historical research should be conducted well in advance of physical investigation. This allows time for important written, visual, and oral information to be located, transcribed, organized, studied and used for planning the actual work.

A thorough scholarly study of a building’s history provides a responsible framework for the physical investigation; in fact, the importance of the link between written historical research and structural investigation cannot be overestimated. For example, the historical research of a building through deed records may merely determine the sequence of owners. This, in turn, aids the investigation of the building by establishing a chronology and identifying the changes each occupant made to the building. A letter

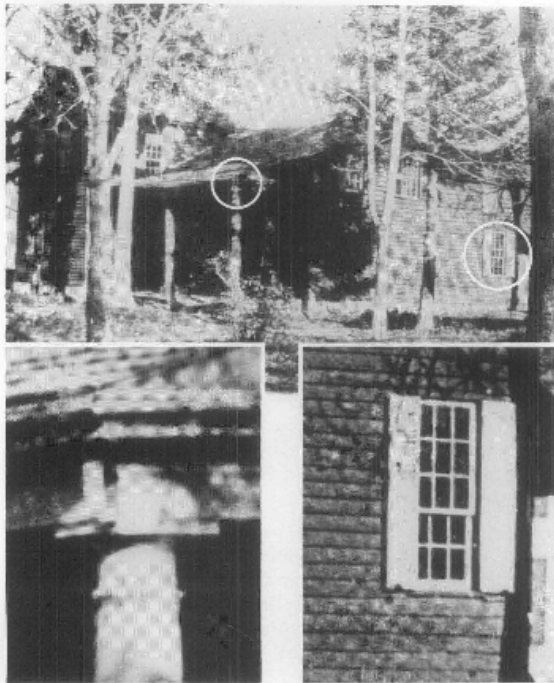


Figure 2. Early photographs discovered during historical research can be enhanced through photo-micrography to accurately recreate missing elements and details during restoration. The enlargements helped clarify questions about the porch column detail and the type of shutter hardware. photo: E. C. Stanton House, courtesy Seneca Falls Historical Society, New York; insets: NPS North Atlantic Cultural Resource Center, Building Conservation Branch.

may indicate that an occupant painted the building in a certain year; the courthouse files contain the occupant's name and paint analysis of the building will yield the actual color. Two-dimensional documentary research and three-dimensional physical investigation go hand-in-hand in analyzing historic structures. The quality and success of any restoration project is founded upon the initial research.

**Documentation.** A building should be documented prior to any inventory, stabilization or investigative work in order to record crucial material evidence. A simple, comprehensive method is to take 35 mm photographs of every wall elevation (interior and exterior), as well as general views, and typical and unusual details. The systematic numbering of rooms, windows and doors on the floor plan will help organize this task and also be useful for labelling the photographs. Video coverage with annotated sound may supplement still photographs. Additional methods of documentation include written descriptions, sketches, and measured drawings.

Significant structures, such as individually listed National Register properties or National Historic Landmarks, benefit from professional photographic documentation and accurate measured drawings. Professionals frequently use *The Secretary of the Interior's Standards and Guidelines for Architectural and Engineering Documentation: HABS/HAER Standards*. It should be remembered that the documents created during investigation might play an unforeseen role in future treatment and interpretation.

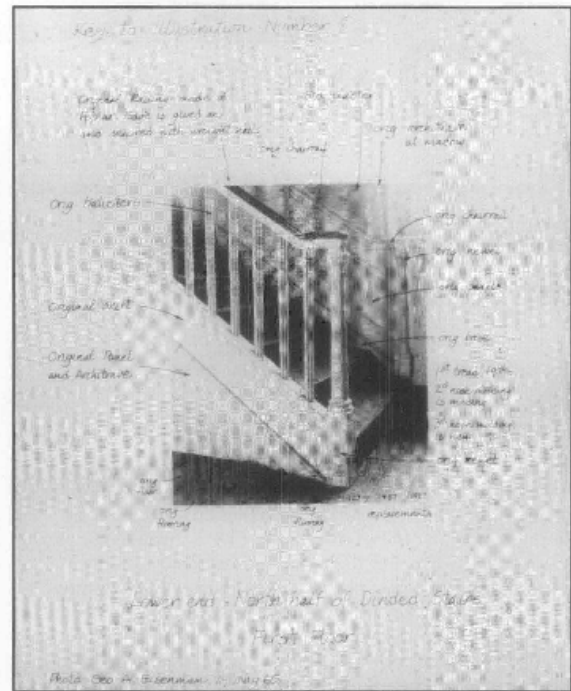


Figure 3. Dating, labeling, and providing annotated photographs is a simple, yet effective, way to document today's preservation efforts for future work and research. A useful document can be created by mounting a photograph upon archival paper and writing the annotations by hand. photo: NPS Preservation Assistance Division Files.

Documentation is particularly valuable when a feature will be removed or altered.

**Inventory.** The historic building and its components should be carefully inventoried prior to taking any action; premature clean-up of a structure or site can be a mistake. A careful look at all spaces in and around a building may reveal loose architectural artifacts, fragile evidence or clues to historic landscape features. This thorough observation includes materials and features which have fallen off due to deterioration, fragments removed and stored in basements, attics or outbuildings, and even materials which have seemingly been discarded.

In the beginning, anything that seems even remotely meaningful should be saved. A common mistake is to presume to know the value of artifacts or features at the beginning of a project. Even if the period of significance or interpretation is known from the beginning, evidence from all periods should be protected. Documentation for future study or use includes labelling and, if possible, photographing prior to storage in a secure place.

**Stabilization.** In many cases, emergency stabilization is necessary to ensure that a structure does not continue to deteriorate prior to a final treatment or to ensure the safety of current occupants, investigators, or visitors. Although severe cases might call for structural remedies, in more common situations, preliminary stabilization would be undertaken on a maintenance level. Such work could involve installing a temporary roof covering to keep water out; diverting water away from foundation walls; removing plants that hold water too close to the walls; or securing a



Figure 4. An inventory of animal nests found within hidden spaces of a structure may yield unexpected evidence, such as information about food, decorative arts, and cultural or social traditions of every day life. Typical items of paper, fabric and wood are important artifacts which are generally not found during archeology digs in the ground. photo: Tom Graves, Jr., courtesy Jefferson's Poplar Forest.

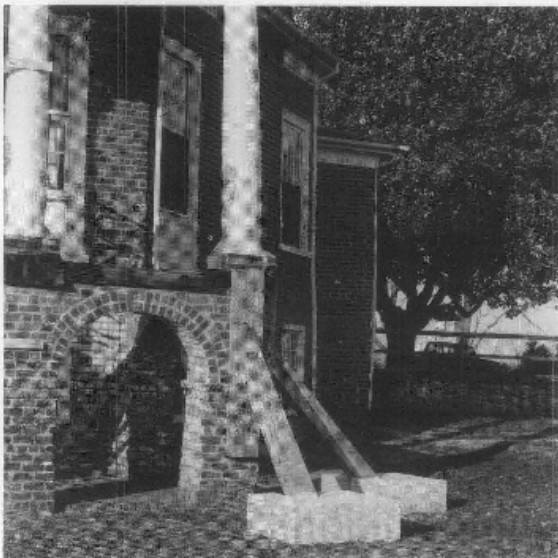


Figure 5. Investigation frequently identifies urgent needs of stabilization. Priority must be given to issues of safety and structural integrity. Supplemental support, such as temporary shoring, may be required to prevent collapse and should be reviewed by a structural engineer.

structure against intruding insects, animals and vandals.

An old building may require temporary remedial work on exterior surfaces such as reversible caulking or an impermanent, distinguishable mortar. Or if paint analysis is contemplated in the future, deteriorated paint can be protected without heavy scraping by applying a recognizable "memory" layer over all the historic layers. Stabilization adds to the cost of any project, but human safety and the protection of historical evidence are well worth the extra money.

### Investigators and Investigative Skills

**General and Specialized Skills.** The essential skill needed for any level of investigation is the ability to observe closely and to analyze. These qualities are ideally combined with a hands-on familiarity of historic buildings—and an open mind! Next, whether acquired in a university or in a practical setting, an investigator should have a good general knowledge of history, building design history and, most important, understand both construction and finish technologies.

But it is not enough to know architectural style and building technology from a national viewpoint; the investigator needs to understand regional and local differences as well. While investigative skills are transferable between regions and chronological periods, investigators must be familiar with the peculiarities of any given building type and geographical area.

Architectural survey and comparative fieldwork provides a crucial database for studying regional variations in historic buildings. For example, construction practices can reflect shared experiences of widely diverse backgrounds and traditions within a small geographical area. Contemporary construction practice in an urban area might vary dramatically from that of rural areas in the same region. Neighbors or builders within the same geographical area



Figure 6. An investigator must have the skill and ability to closely observe and analyze the materials with a broad understanding of historic construction practices and technologies. Through the collection of samples and analysis of materials, investigative questions are either answered, refined, or formulated.

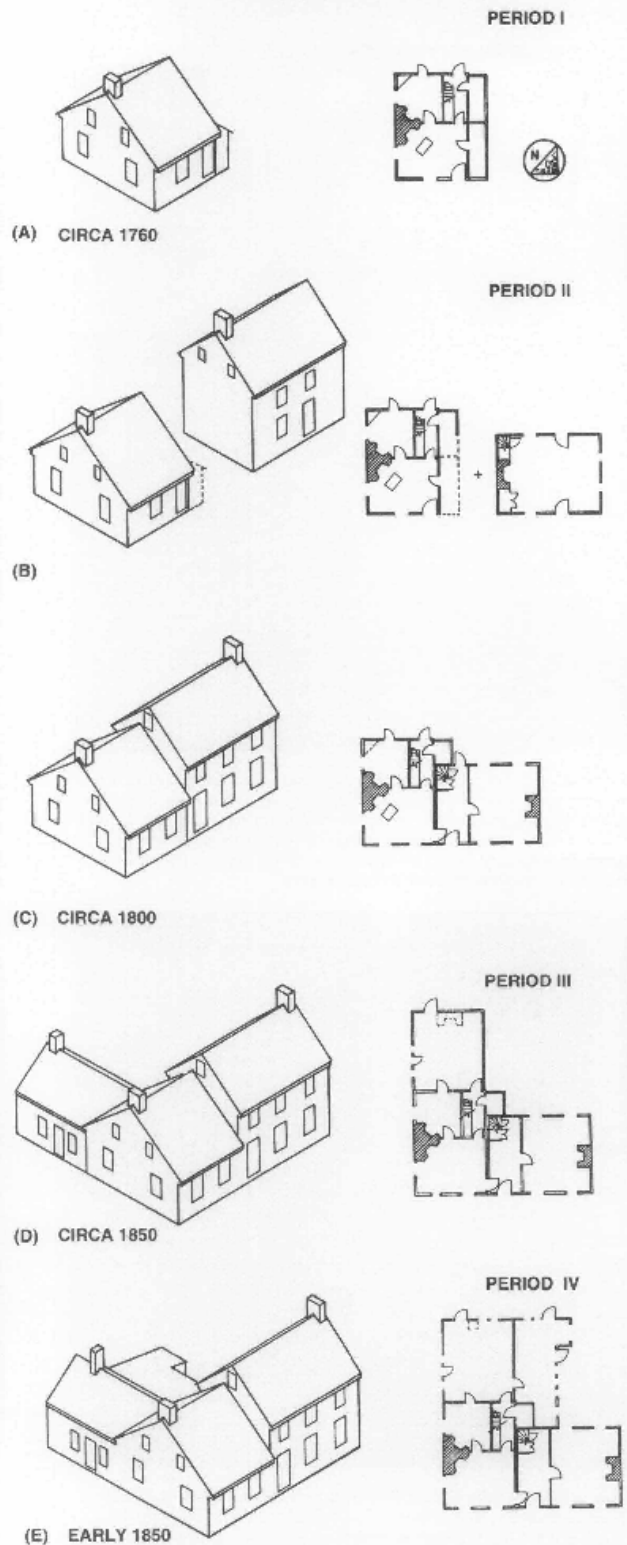
### Showing the Evolution of an 18th Century Farmhouse

Most structures evolve over time. Houses, perhaps more than other building types, are often subjected to a full range of change that reflects a wide variety of solutions for creating new living space or eliminating outmoded spaces. Architectural changes to historic houses can be studied through the close physical examination of construction and decorative details. Tracing the history of alterations over time is tantamount to "excavating" the structure, somewhat like an archeological investigation. By peeling back its layers of occupation and assembling plan changes, a sequence of consecutive solutions or transformations can be developed that reveals people's ongoing desires for new and improved living conditions.

The example of a Sussex County, Delaware, house—from ca. 1790 to the early 1900s—illustrates how complicated the pattern of change over time can become in outlining an individual house history. The Hunter Farm House was built in the 18th century as a double-cell, double-pile, half-passage plan (a). Two bays across the front and two stories tall, the house possessed back-to-back corner fireplaces with fully paneled fireplace walls in the front and back rooms. A stair in the rear passage provided access to the second floor. A one-story, two-room shed that was attached to the gable wall farthest from the fireplace was accessed by a low door leading from the front room.

During the course of its history, the house was altered at least three times. The five-part illustration shows the house's transformation from an open plan to a Georgian plan and the subsequent addition and re-arrangement of service rooms for cooking and storage. The first remodelling occurred in the early nineteenth century when the lean-to shed was removed, and a two-story, single-pile, two-bay house was moved up and attached to the northwest gable of the existing building (b). (The newly attached building had originally been furnished with opposing doors and windows on the front and back facades, a fireplace on the southeast gable, and double windows on the opposite end.) When the second building was joined to the first, the fireplace in the newer building was relocated to the opposite gable; the front door in the older house moved to a more central position; and a center-hall plan created with a roughly symmetrical front elevation (c). A subsequent alteration later in the nineteenth century included the addition of a one-story rear service ell (d). Finally, in the early 1900s, the one-story service wing was increased. During this last remodeling, the large kitchen hearth was demolished and replaced with a stove and new brick flue (e).

*Sidebar: Bernard L. Herman and Gabrielle M. Lanier, University of Delaware. Drawings by: Center for Historic Architecture and Engineering, University of Delaware.*



often practice different techniques of constructing similar types of structures contemporaneously. Reliable dating clues for a certain brick bond used in one state might be unreliable for the same period in a different state. Regional variation holds true for building materials as well as construction.

Finally, even beyond regional and local variation, an investigator needs to understand that each building has its own unique history of construction and change over time. Form, features, materials and detailing often varied according to the tastes and finances of both builder and supplier; construction quality and design were also inconsistent, as they are today.

**Specialists on a Team.** Because architectural investigation requires a wide range of knowledge and many different skills, various people are likely to interact on the same project. While homeowners frequently execute small-scale projects, more complex projects might be directed by a craftsman, an architect or a conservator. For large-scale projects, a team approach may need to be adopted, consisting of professionals interacting with additional consultants. Consulting specialists may include architectural historians, architectural conservators, craftsmen, historic finish analysts, historians, archeologists, architects, curators, and many others. The scope and needs of a specific project dictate the skills of key players.

Architectural investigation often includes the related fields of landscape and archeological investigation. Landscape survey or analysis by horticulturists and landscape architects identify pre-existing features or plantings or those designed as separate or complementary parts of the site. Both above and below-ground archeology contribute information about missing or altered buildings, construction techniques, evidence of lifestyle and material culture, and about the evolution of the historic landscape itself.

**Architectural Evidence: Studying the Fabric of the Historic Building:**

**Original Construction and Later Changes.** Research prior to investigation may have indicated the architect, builder or a building’s date of construction. In the absence of such information, architectural histories and field guides to architectural style can help identify a structure’s age through its form and style.

Any preliminary date, however, has to be corroborated with other physical or documentary facts. Dates given for stylistic periods are general and tend to be somewhat arbitrary, with numerous local variations. Overall form and style can also be misleading due to subsequent additions and alterations. When the basic form seems in conflict with the details, it may indicate a transition between styles or that a style was simply upgraded through new work.

The architectural investigation usually determines original construction details, the chronology of later alterations, and the physical condition of a structure. Most structures over fifty years old have been altered, even if only by natural forces. People living in a house or using a building for any length of time leave some physical record of their time there, however subtle.

A longer period of occupancy generally counts for greater physical change. Buildings acquire a “historic character” as changes are made over time.

Changes to architectural form over time are generally attributable to material durability, improvement in convenience systems, and aesthetics. First, the durability of building materials is affected by weathering, temperature and humidity, by disasters such as storms, floods or fire, or by air pollution from automobiles and industry. Second, changes in architectural form have always been made for convenience’ sake—fueled by technological innovations—as people embrace better lighting, plumbing, heating, sanitation, and communication. People alter living spaces to meet changing family needs. Finally, people make changes to architectural form, features, and detailing to conform to current taste and style.

**Conducting the Architectural Investigation**

Architectural investigation can range from a simple one hour walk-through to a month long or even multi-year project—and varies from looking at surfaces to professional sub-surface examination and laboratory work.

All projects should begin with the simplest, non-destructive processes and proceed as necessary. The sequence of investigation starts with reconnaissance and progresses to surface examination and mapping, sub-surface non-destructive testing, and various degrees of sub-surface destructive testing.

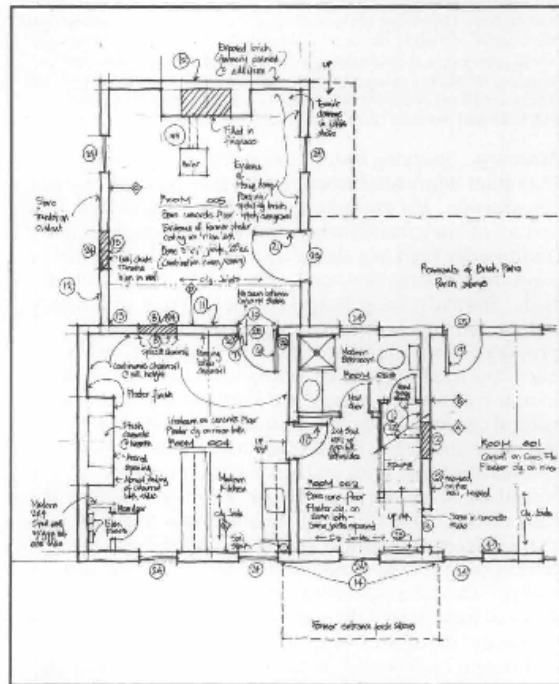


Figure 8. During the initial visit, the architectural investigator may be able to resolve many questions about the building’s condition and chronology while recording their observations through field notes and annotated sketches. Drawing by Marianne Graham, courtesy Jefferson’s Poplar Forest Restoration Field School.

### Looking More Closely at Historic Building Materials and Features

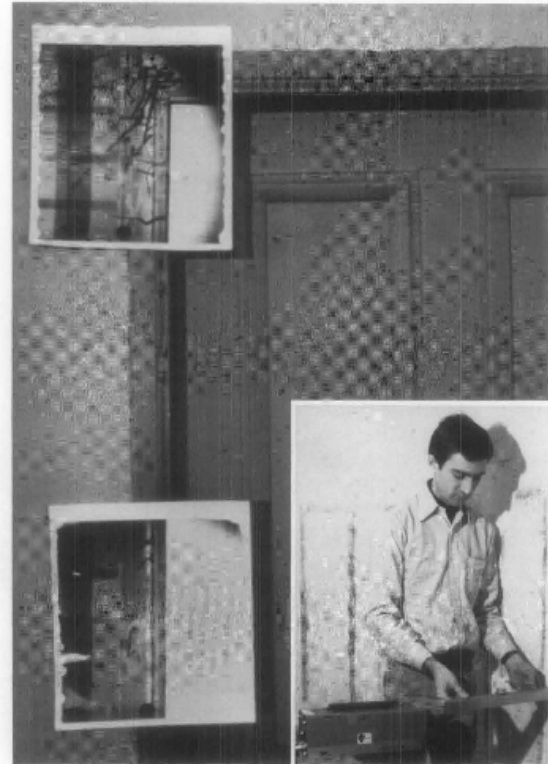
*Although brick or wood frame buildings are the most common in this country, similar sets of characteristics and questions can be established for examining log, adobe, steel, or any other material.*



*Figure A. Careful examination of the masonry reveals different periods of construction and repair through the composition and detailing of bricks and mortar. Depending upon location, open vertical joints may indicate the location of nailing blocks for decorative trim or weeps for drainage. These open joints at the building's cornice show evidence of an earlier wooden entablature extending down two courses below the present trim. The paint ghosts below the lowest blocks confirms the entablature's existence and provides clues to its size and finish.*

**Masonry.** Studying historic brickwork can provide important information about methods of production and construction. For example, the color, size, shape and texture of brick reveals whether it was hand molded and traditionally fired in a clamp with hardwoods, or whether it was machine molded and fired in a kiln using modern fuels. Similarly, the principal component part of masonry mortar, the lime or cement, reveals whether it was produced in a traditional or modern manner. Certain questions need to be asked during investigation. Is the mortar made with a natural or a Portland cement? If a natural cement, did it come from an oyster shell or a limestone source? Is it hydrated or hydraulic? As a construction unit, brick and mortar further reveal something about the time, place and human variables of construction, such as the type of bond, special brick shapes, decorative uses of glazed or rubbed brick, coatings and finishes, and different joints, striking and tooling. Does the bond conform with neighboring or regional buildings of the same period? Does the pattern of "make up" bricks in a Flemish Bond indicate the number of different bricklayers? What is the method of attaching wood trim to the masonry? The same types of questions related to production and construction characteristics can be applied to all types of masonry work, including stone, concrete, terra cotta, adobe and coquina construction. A complete survey undertaken during "surface mapping" can outline the materials and construction practices for the

various periods of a structure, distinguishing the original work as well as the additions, alterations, and replacements.



*Figure B. Without damaging or altering historic fabric, X-ray images of wood connections provide internal views of construction materials and techniques. These x-ray images show nails being used to form the connections of a door opening in a wood stud wall covered with plaster and cut wooden lath. A single technician can operate the portable equipment and develop the film on site for immediate analysis. photos: NPS North Atlantic Cultural Resource Center, Building Conservation Branch.*

**Wood.** Buildings constructed with wood have a very different set of characteristics, requiring a different line of questioning. Is the wooden structural system log, timber frame, or balloon frame construction? Evidence seen on the wood surface indicates whether production was by ax, adze, pit saw, mill saw (sash or circular), or band saw. What are the varying dimensions of the lumber used? Finished parts can be sawn, gouged, carved, or planed (by hand or by machine). Were they fastened by notching, mortise and tenon, pegs, or nailing? If nails were used, were they wrought by hand, machine cut with wrought heads, entirely machine cut, or machine wire nails? For much of the nineteenth century the manufacture of nails underwent a series of changes and improvements that are dateable, allowing nails to be used as a tool in establishing periods of construction and alteration. Regardless of region or era, the method of framing, joining and finishing a wooden structure will divulge something about the original construction, its alterations, and the practices of its builders. Finally, does some of the wood

appear to be re-used or re-cycled? Re-used and reproduction materials used in early restoration projects have confused many investigators. When no identification record was kept, it can be a problem distinguishing between materials original to the house and later replacement materials.

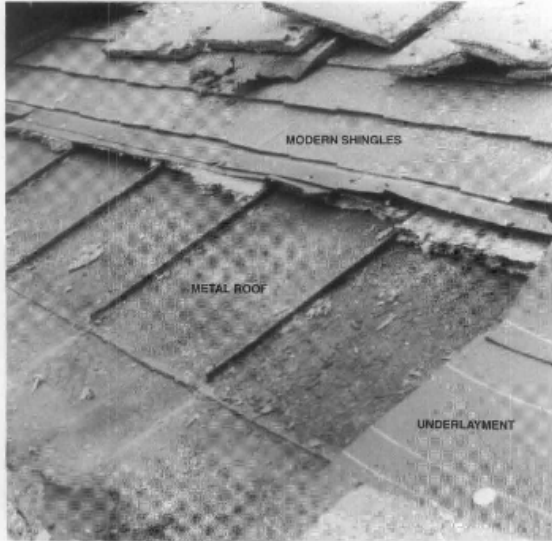


Figure C. In many cases, new materials or coverings are placed directly over existing exterior features, preserving the original materials underneath. Here, the removal of a modern shingle roof and its underlayment revealed an historic standing seam metal roof. photo: courtesy, Phillips and Opperman, P.A.

**Roofs.** Exterior features are especially prone to alteration due to weathering and lack of maintenance. Even in the best preserved structures, the exterior often consists of replaced or repaired roofing parts. Roof coverings typically last no more than fifty years. Are several generations of roof coverings still in place? Can the layers be identified? If earlier coverings were removed, the sheathing boards frequently provide clues to the type of covering as well as missing roof features. Dormers, cupolas, finials, cresting, weathervanes, gutters, lightning rods, skylights, balustrades, parapets and platforms come and go as taste, function and maintenance dictate. The roof pitch itself can be a clue to stylistic dating and is unlikely to change unless the entire roof has been rebuilt. Chimneys might hold clues to original roof pitch, flashings, and roof feature attachments. Is it possible to look down a chimney and count the number of flues? This practice has occasionally turned up a missing fireplace. In many parts of the country, nineteenth-century roof coverings evolved from wooden shingles or slate shingles, to metal shingles, to sheet metal, and still later in the twentieth century, to asphaltic or asbestos shingles. Clay tiles can be found covering roofs in seventeenth and eighteenth-century settlements of the east coast as well as western and southwestern Spanish settlements from the same period. Beyond the mid-nineteenth century, and into the twentieth, the range and choice of roof coverings greatly expanded.

**Floors.** In addition to production and construction clues, floors reveal other information about the interior, such as circulation patterns, furniture placement, the use of carpets, floor cloths, and applied floor finishes. Is there a pattern of tack holes? Tacks or tack holes often indicate the position and even the type of a floor covering. A thorough understanding of the seasonal uses of floor coverings and the technological history of their manufacture provide the background for identifying this type of evidence.

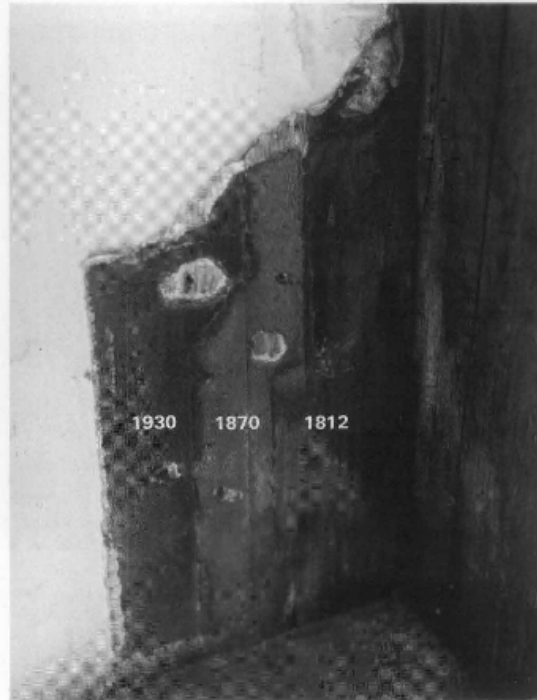
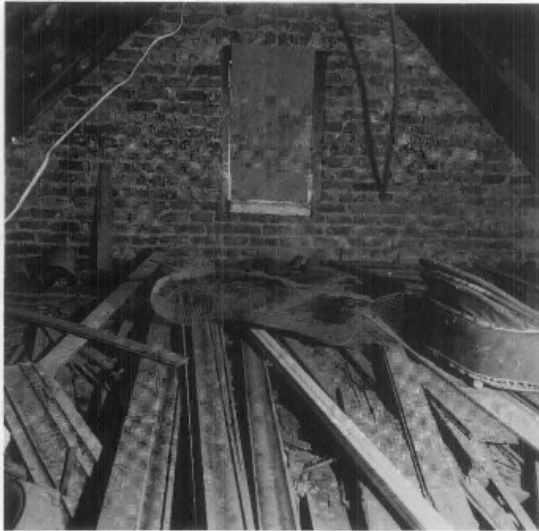


Figure D. Building styles change over time as moldings and trims are added and removed. The ghosts of the previous woodwork are often left behind and preserved under the new trim. This photograph shows distinct profiles of architectural trim from three successive periods. photo: courtesy, Valentine Museum, Richmond, Virginia.

**Walls.** Walls and their associated trim, both outside and inside, hold many clues to the building's construction and changes made over time. The overall style of moldings, trim and finishes, and their hierarchical relationship, can help explain original construction as well as room usage and social interaction between rooms. Holes, scars, patches, nails, nail holes, screws and other hardware indicate former attachments. Are there "ghosts," or shadow outlines of missing features, or trim attachments such as bases, chair rails, door and window casings, entablatures, cornices, mantels and shelves? Ghosts can be formed by paint, plaster, stucco, wear, weathering or dirt. Interior walls from the eighteenth and early nineteenth-century were traditionally plastered after grounds or finished trim was in place, leaving an absence of plaster on the wall behind them. Evidence of attachments on window casings can also be helpful in understanding certain interior changes. Other clues to look for include



the installation of re-used material brought into a house or moved about within a house; worker's or occupant's graffiti, especially on the back of trim; and hidden finishes or wallpaper stuck in crevices or underneath pieces of trim. Stylistic upgrading often resulted in the re-use of outdated trim for blocking or shims. Unexpected discoveries are particularly rewarding. Investigators frequently tell stories about clues that were uncovered from architectural fragments carried off by rats and later found, or left by workers in attics, between walls and under floors.

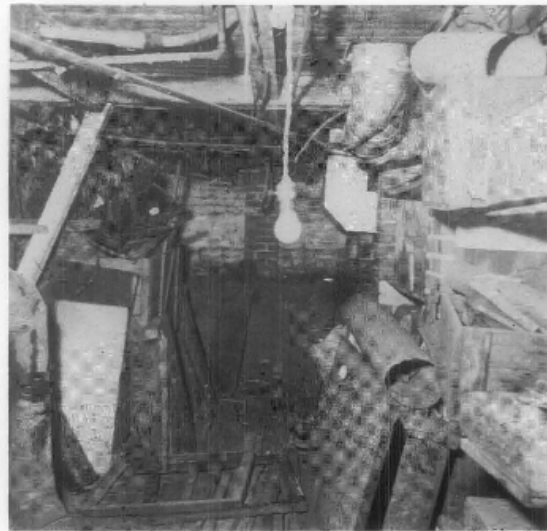


*Figure E. Discarded items are routinely stored within attics, then forgotten, only to be discovered during a later investigation. Seemingly worthless clutter and debris may help answer many questions. A thorough inventory should be performed before evaluating any object's usefulness.*

**Attics and Basements.** Attics and basements have been known as collection points for out-of-date, out-of-style and cast-off pieces such as mechanical systems, furnishings, family records and architectural fragments. These and other out-of-the-way places of a structure provide an excellent opportunity for non-destructive investigation. Not only are these areas where structural and framing members might be exposed to view, they are also areas which may have escaped the frequent alteration campaigns that occur in the more lived-in parts of a building. If a building has been raised or lowered in height, evidence of change would be found in the attic as well as on the exterior. Evidence of additions might also be detected in both the attic and the basement. Attics frequently provide a "top-side" view at the ceiling below, revealing its material, manner of production and method of attachment. A "bottom-side" view of the roof sheathing or roof covering can be seen from the attic as well.

Basements generally relate more to human service functions in earlier buildings and to mechanical services in more recent eras. For example, a cellar of an urban

1812 house disclosed the following information during an investigation: first period bell system, identification of a servant's hall, hidden fireplace, displacement of the service stairs, identification of a servants' quarters, an 1850s furnace system, 1850s gas and plumbing systems, relocation of the kitchen in 1870, early use of 1890s concrete floor slabs and finally, twentieth century utility systems. While the earliest era had been established as the interpretation period, evidence from all periods was documented in order to understand and interpret how the house evolved or changed over time.



*Figure F. Outdated fixtures and systems are frequently abandoned in place when more modern units are installed. Examining and documenting their existence can provide a technological reference to the history and use of many rooms or structures. photo: NPS Preservation Assistance Division Files.*

**Mechanical, Electrical, Plumbing and Other Systems.** Systems of utility and convenience bear close scrutiny during investigation. All historic buildings inhabited and used by people reveal some association, at the very minimum, with the necessities of lighting, climate control, water, food preparation, and waste removal. Later installations in a building may include communication, hygiene, food storage, security, and lightning protection systems. Other systems, such as transportation, are related to more specific functions of commercial or public structures. Although research into the social uses of rooms and their furnishings has borne many new studies, parallel research into how people actually carried out the most mundane tasks of everyday life has been fairly neglected. Utility and convenience systems are most prone to alteration and upgrading and, at the same time, less apt to be preserved, documented or re-used. Understanding the history or use of a building, and the history of systems technology can help predict the physical evidence that might be found, and what it will look like after it is found.

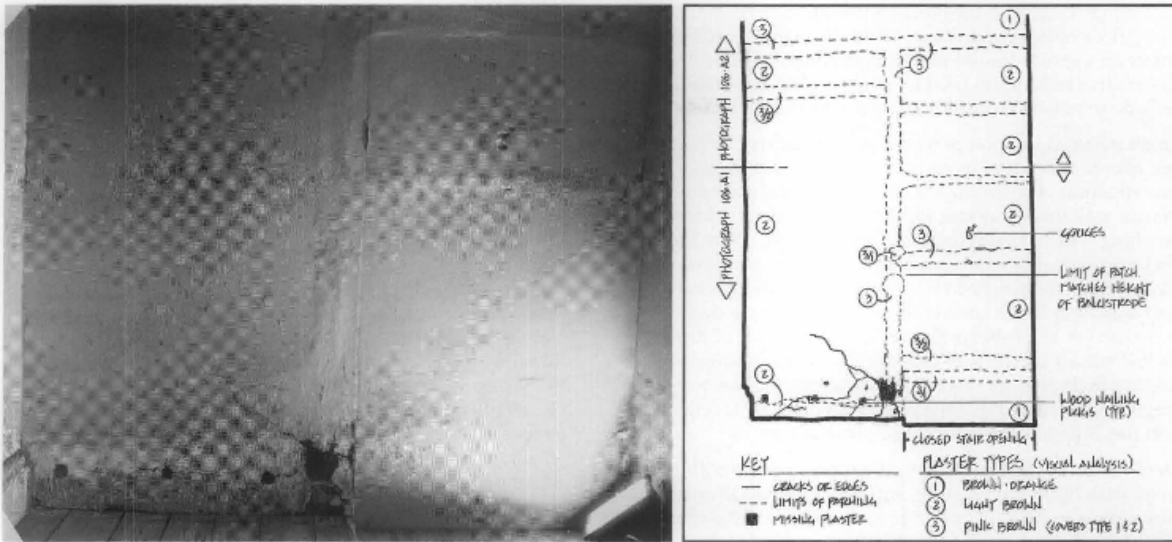


Figure 9. Raking light is used to show irregularities on flat surfaces. Patches, repairs, and alterations can then be mapped by the shadows or ghosts they cast. In this case, the pattern of patched plaster suggested the removal shelves and a balustrade handrail from the wall. Historical research and plaster analysis confirmed the findings and the sequence of change.

**Reconnaissance.** An initial reconnaissance trip through a structure—or visual overview—provides the most limited type of investigation. But experienced investigators accustomed to observation and analysis can resolve many questions in a two-to-four hour preliminary site visit. They may be able to determine the consistency of the building’s original form and details as well as major changes made over time.

**Surface Mapping.** The first step in a thorough, systematic investigation is the examination of all surfaces. Surface investigation is sometimes called “surface mapping” since it entails a minute look at all the exterior and interior surfaces. The fourfold purpose of surface mapping is to observe every visible detail of design and construction; develop questions related to evidence and possible alterations; note structural or environmental problems; and help develop plans for any further investigation. Following investigation, a set of documentary drawings and photographs is prepared which record or “map” the evidence.

While relying upon senses of sight and touch, the most useful tool for examining surfaces is a high-powered, portable light used for illuminating dark spaces as well as for enhancing surface subtleties. Raking light at an angle on a flat surface is one of the most effective means of seeing evidence of attachments, repairs or alterations.

**Non-Destructive Testing.** The next level of investigation consists of probing beneath surfaces using non-destructive methods. Questions derived from the surface mapping examination and analysis will help determine which areas to probe. Investigators have perfected a number of tools and techniques which provide minimal damage to historic fabric. These include x-rays to penetrate surfaces in order to see nail types and joining details; boroscopes, fiber optics and small auto mechanic or dentists’ mirrors to look inside of tight spaces; and ultra violet or infra-red lights to observe differences in materials and finishes. The most advanced

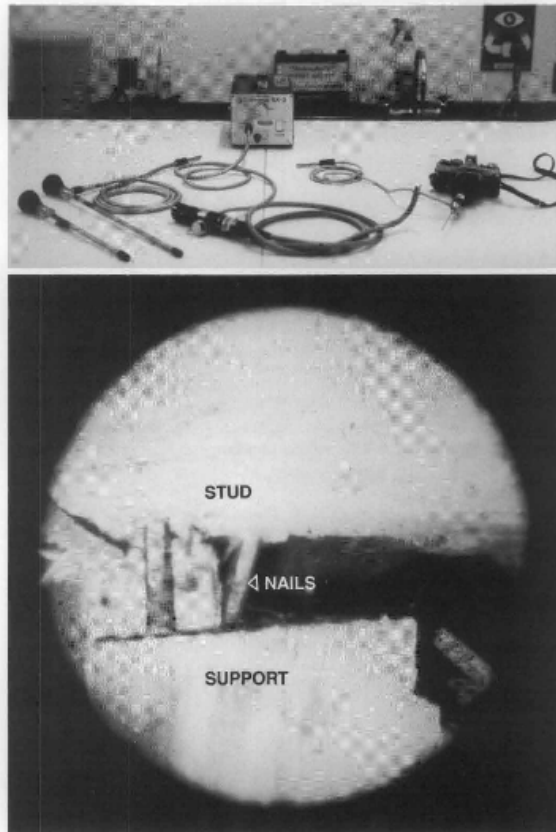


Figure 10. Top: A boroscope is a fiber-optic tube which can provide views into the framing connections of a wall through an existing crack or hole. Bottom: Once the image is oriented, the investigator can see an open joint between the wood stud and its nailed lateral support. photos: NPS North Atlantic Cultural Resource Center, Building Conservation Branch.

technology combines the boroscope with video cameras using fiber optic illumination. In addition to the more common use of infra-red photography, similar non-destructive techniques used in archeological investigations include remote sensing and ground-penetrating radar.

Small material samples of wood, plaster, mortar, or paint can also be taken for laboratory analysis at this stage of investigation. For instance, a surface examination of a plaster wall using a raking light may show clear evidence of patching which corresponds to a shelf design. Were the shelves original or a later addition? A small sample of plaster from the patched area is analyzed in the laboratory and matches plaster already dated to a third period of construction. A probe further reveals an absence of first period plaster on the wall underneath. The investigator might conclude from this evidence that the shelves were an original feature and that the plaster fill dates their removal and patching to a third period of construction.

**Destructive Testing.** Most investigations require nothing more than historical research, surface examination and non-destructive testing. In very rare instances the investigation may require a sub-surface examination and the removal of fabric. Destructive testing should be carried out by a professional only after historical research and surface mapping have been fully accomplished and *only after* non-destructive testing has failed to produce the necessary information. Owners should be aware that the work is a form of demolition in which the physical record may be destroyed. Sub-surface examination begins with the most accessible spaces, such as retrofitted service and mechanical chases; loose or previously altered trim, ceilings or floor boards; and pieces of trim or hardware which can be easily removed and replaced.

Non-destructive testing techniques do not damage historic

fabric. If non-destructive techniques are not sufficient to resolve important questions, small "windows" can be opened in surface fabric at predetermined locations to see beneath the surface. This type of subsurface testing and removal is sometimes called "architectural archeology" because of its similarity to the more well-known process of trenching in archeology. The analogy is apt because both forms of archeology use a method of destructive investigation.

Photographs, video and drawings should record the before, during and after evidence when the removal of historic fabric is necessary. The selection and sequence of material to be removed requires careful study so that original extant fabric remains *in situ* if possible. If removed, original fabric should be carefully put back or labelled and stored. At least one documentary patch of each historic finish should be retained *in situ* for future research. Treatment and interpretation, no matter how accurate, are usually not final; treatment tends to be cyclical, like history, and documentation must be left for future generations, both on the wall and in the files.

**Laboratory Analysis.** Laboratory analysis plays a scientific role in the more intuitive process of architectural investigation. One of the most commonly known laboratory procedures used in architectural investigation is that of historic paint analysis. The chronology and stratigraphy of applied layers can establish appropriate colors, finishes, designs or wall coverings. When conducted simultaneously with architectural investigation, the stratigraphy of finishes, like that of stratigraphic soils in archeology, helps determine the sequence of construction or alterations in a building. Preliminary findings from *in situ* examinations of painted finishes on walls or trim are common, but more accurate results come from extensive

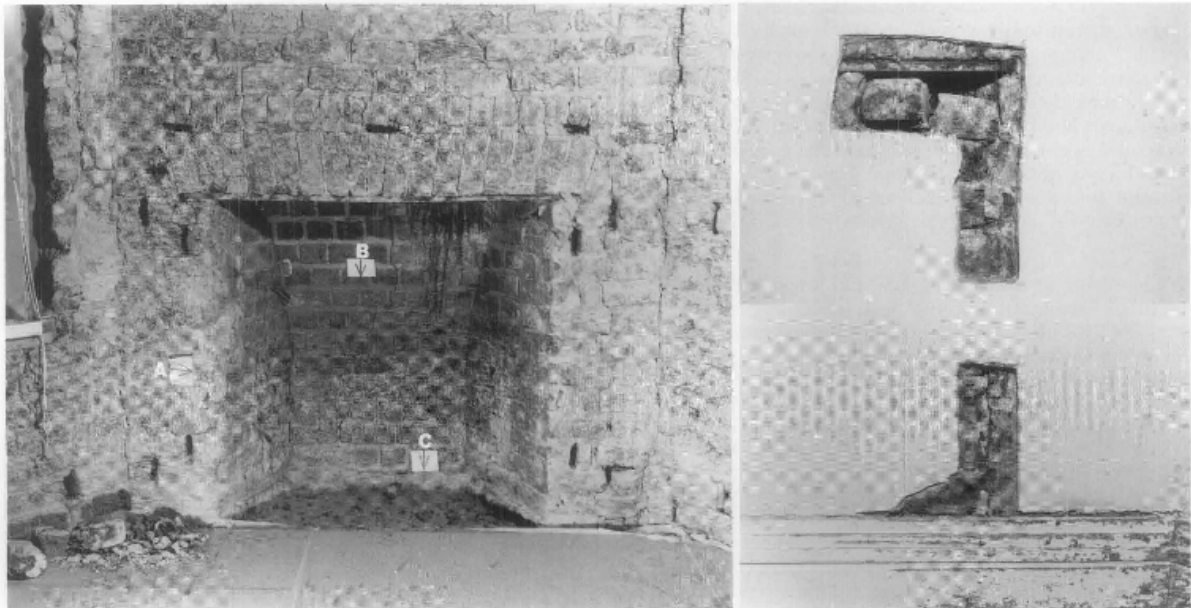


Figure 11. The physical evidence of cracks and patches seen during surface mapping suggested an abandoned fireplace. Right: Exploratory testing was used to verify its location. Left: Museum restoration required more detailed probing to discover the original detailing. Plaster and brick were carefully documented and removed to determine the fireplace's type, size, and decoration. The rectangular slots held wooden nailing blocks supporting the mantel and surround. A indicates the inside edge of the surround; B points to the ghost from an iron fireback and C shows the original floor level of the hearth.

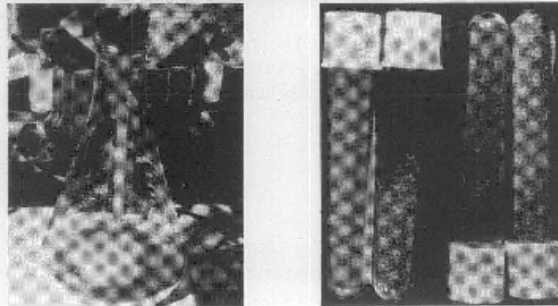
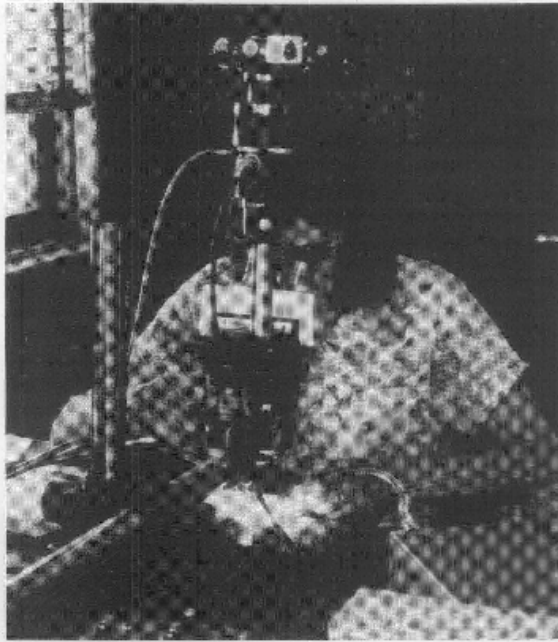


Figure 12. During a thorough investigation, the mortar sample is viewed under a microscope using various lighting to find the presence of coatings or additives. It is then ground and washed in an acid bath to separate and free the sand and fibers. After further cleaning, these fines are stored and used for comparison in matching or dating repairs and alterations. photos: NPS North Atlantic Cultural Resource Center, Building Conservation Branch.

sampling and microscopic laboratory work using chemical analysis and standardized color notations. Consultants without the proper knowledge have been known to cause far more harm than good.

Mortar and plaster analysis often provide a basis for dating construction with minimal intervention. Relatively small samples of the lime-based materials can be chemically separated into their component parts of sands and fines, which are then visually compared to equivalent parts of known or dated samples. A more thorough scientific approach may be used to accurately profile and compare samples of other materials through elemental analysis. Two similar methods in common use are Neutron Activation and Energy Dispersive Spectroscopy (EDS). Neutron Activation identifies the sample's trace elements by monitoring their response to neutron bombardment. EDS measures the response to electron bombardment through

the use of an electron microscope. In both tests, the gathered information is plotted and matched with the reactions of known elements. The results provide a quantitative and qualitative profile of the sample's elemental components for use in further comparisons.

Dendrochronology presents a minimally destructive process for dating wooden members. Also called tree ring dating, this process relies on the comparative wet and dry growth seasons of trees as seen in their rings via a core sample. This technique has two limitations: a very extensive data base must be compiled for climatic conditions over a long span of years and matched with corresponding tree ring samples; and the core samples can only be taken from timber which still has a bark edge. Simple identification of wood species during an investigation can be determined from small samples sent to a forest products laboratory.

### After Architectural Investigation: Weighing the Evidence

Evidence, questions, and hypotheses must be continually evaluated during investigation. Like a detective constructing a case, an investigator must sort out information to get at "the facts." Yet, are the "facts" conclusive at any time?

Observations made during the surface mapping may identify random features. These features begin to form patterns; then, sets of patterns, perhaps representing alterations from multiple eras, begin to appear. If the right questions are not asked, the evidence can remain hidden. Hypotheses are formed, questioned, tested, re-formed and either rejected or substantiated. This process is repeated as more "facts" are uncovered and questions asked. Eventually the evidence seems conclusive. These conclusions, in turn, may lead to re-examination, more historical research, and the advice of specialized consultants. At some point, treatment generally follows based on the collective, educated conclusions of an entire professional team.

### Keeping a Responsible Record for Future Investigators

The evidence collected during investigation, and any conclusions which can be drawn from it, should be documented in a written report. The complexity of a project dictates the complexity of the resulting record. It may be wise to maintain a report in an expandable format if long or extensive work is expected—additional evidence will undoubtedly need to be incorporated that alters previous conclusions. Reports tend to range from annotated photographs in loose-leaf binders to full-length bound "books."

Putting findings and conclusions in an accessible form helps those who are planning treatment. For example, a rehabilitation project may require documentation to satisfy grant funding or tax credit program requirements; preservation and restoration projects always need careful documentation to guide the work. After work, the investigation report and notes on the treatment itself are made into a permanent file record. Whether or not work is

being planned, the architectural investigation report will always be of value to future researchers or owners of the building.

The most common professional document is called an *Historic Structure Report*. This invaluable tool for preservation typically contains historical as well as physical information. Sections include a history of the building, an architectural description of the original structure and changes made over time, the results of all investigations, a record of current conditions or problems, of past repairs and treatments, and recommendations for current and future action. They are seldom definitive; thus, research is a continuing process.

### Conclusion

Architectural investigation plays a critical role in making responsible decisions about treating and interpreting historic buildings. A successful project to research, inventory, document, and ultimately treat and interpret a building is directly linked to the knowledge and skills of architectural investigators and other historic preservation specialists. The expressed goal of historic preservation is to protect and preserve materials and features that convey the significant history of a place. Careful architectural investigation—together with historical research—provides a firm foundation for this goal.

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### Cover Photo:

*An historical architect analyzes and records his investigative findings while on site. photo: courtesy Valentine Museum.*

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# 47 PRESERVATION BRIEFS

## Maintaining the Exteriors of Small and Medium Size Historic Buildings

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National Park Service  
U.S. Department of the Interior  
Heritage Preservation Services



Preservation is defined as “the act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the *ongoing maintenance and repair* of historic materials and features rather than extensive replacement and new construction.”<sup>1</sup>

Maintenance helps preserve the integrity of historic structures. If existing materials are regularly maintained and deterioration is significantly reduced or prevented, the integrity of materials and workmanship of the building is protected. Proper maintenance is the most cost effective method of extending the life of a building. As soon as a building is constructed, restored, or rehabilitated, physical care is needed to slow the natural process of deterioration. An older building has already experienced years of normal weathering and may have suffered from neglect or inappropriate work as well.

Decay is inevitable but deterioration can accelerate when the building envelope is not maintained on a regular basis. Surfaces and parts that were seamlessly joined when the building was constructed may gradually become loose or disconnected; materials that were once sound begin to show signs of weathering. If maintenance is deferred, a typical response is to rush in to fix what has been ignored, creating additional problems. Work done on a crisis level can favor inappropriate treatments that alter or damage historic material.

There are rewards for undertaking certain repetitive tasks consistently according to a set schedule. Routine and preventive care of building materials is the most effective way of slowing the natural process of deterioration. The survival of historic buildings in good condition is primarily due to regular upkeep and the preservation of historic materials.

Well-maintained properties tend to suffer less damage from storms, high winds, and even small earthquakes. Keeping the roof sound, armatures and attachments such

as shutters tightened and secured, and having joints and connections functioning well, strengthens the ability of older buildings to withstand natural occurrences.

Over time, the cost of maintenance is substantially less than the replacement of deteriorated historic features and involves considerably less disruption. Stopping decay before it is widespread helps keep the scale and complexity of work manageable for the owner.

This *Preservation Brief* is designed for those responsible for the care of small and medium size historic buildings, including owners, property administrators, in-house maintenance staff, volunteers, architects, and maintenance contractors. The Brief discusses the benefits of regular inspections, monitoring, and seasonal maintenance work; provides general guidance on maintenance treatments for historic building exteriors; and emphasizes the importance of keeping a written record of completed work.

### Getting Started

Understanding how building materials and construction details function will help avoid treatments that are made in an attempt to simplify maintenance but which may also result in long-term damage. It is enticing to read about “maintenance free” products and systems, particularly waterproof sealers, rubberized paints, and synthetic siding, but there is no such thing as maintenance free when it comes to caring for historic buildings. Some approaches that initially seem to reduce maintenance requirements may over time actually accelerate deterioration.

Exterior building components, such as roofs, walls, openings, projections, and foundations, were often constructed with a variety of functional features, such as overhangs, trim pieces, drip edges, ventilated cavities, and painted surfaces, to protect against water infiltration, ultraviolet deterioration, air infiltration, and

Figure 1. Maintenance involves selecting the proper treatment and protecting adjacent surfaces. Using painter's tape to mask around a brass doorknocker protects the painted door surface from damage when polishing with chemical compounds. On the other hand, hardware with a patinated finish was not intended to be polished and should simply be cleaned with a damp cloth.



### Cautions During Maintenance Work

All maintenance work requires attention to safety of the workers and protection of the historic structure. Examples include the following:

- Care should be taken when working with historic materials containing lead-based paint. For example, damp methods may be used for sanding and removal to minimize air-borne particles. Special protection is required for workers and appropriate safety measures should be followed.
- Materials encountered during maintenance work, such as droppings from pigeons and mice, can cause serious illnesses. Appropriate safety precautions need to be followed. Services of a licensed contractor should be obtained to remove large deposits from attics and crawlspaces.
- Heat removal of paint involves several potential safety concerns. First, heating of lead-containing paint requires special safety precautions for workers. Second, even at low temperature levels, heat removal of paint runs the risk of igniting debris in walls. Heat should be used only with great caution with sufficient coverage by smoke detectors in work areas. Work periods need to be timed to allow monitoring after completion of paint removal each day, since debris will most often smolder for a length of time before breaking out into open flame. The use of torches, open flames, or high heat should be avoided.
- Many chemical products are hazardous and volatile organic compounds (VOC) are banned in many areas. If allowed, appropriate respirators and other safety precautions are essential for use.
- Personal protection is important and may require the use of goggles, gloves, mask, closed-toed shoes, and a hard hat.
- Electrical service should be turned off before inspecting a basement after a flood or heavy rain, where there is high standing water.

pest infestation. Construction assemblies and joints between materials allow for expansion and contraction and the diffusion of moisture vapor, while keeping water from penetrating the building envelope. Older buildings use such features effectively and care must be taken to retain them, avoiding the temptation to reduce air infiltration or otherwise alter them.

Monitoring, inspections, and maintenance should all be undertaken with safety in mind. Besides normal safety procedures, it is important to be cognizant of health issues more commonly encountered with older buildings, such as lead-based paint, asbestos, and bird droppings, and to know when it is necessary to seek professional services (see sidebar).

Original building features and examples of special craftsmanship should be afforded extra care. The patina or aging of historic materials is often part of the charm and character of historic buildings. In such cases, maintenance should avoid attempts to make finishes look new by over-cleaning or cladding existing materials. As with any product that has the potential to harm historic materials, the selection of a cleaning procedure should always involve testing in a discreet location on the building to ensure that it will not abrade, fade, streak, or otherwise damage the substrate (Fig 1).

### Maintenance Plan, Schedules and Inspection

Organizing related work into a written set of procedures, or a Maintenance Plan, helps eliminate duplication, makes it easier to coordinate work effort, and creates a system for prioritizing maintenance tasks that takes into account the most vulnerable and character-defining elements.

The first time a property owner or manager establishes a maintenance plan or program, it is advisable to have help from a preservation architect, preservation consultant, and/or experienced contractor. Written procedures should outline step-by-step approaches that are custom-tailored to a building. No matter how small the property, every historic site should have a written guide for maintenance that can be as simple as:

- 1) Schedules and checklists for inspections;
- 2) Forms for recording work, blank base plans and elevations to be filled in during inspections and upon completion of work;
- 3) A set of base-line photographs to be augmented over time;
- 4) Current lists of contractors for help with complex issues or in case of emergencies;
- 5) Written procedures for the appropriate care of specific materials, including housekeeping, routine care, and preventive measures;
- 6) Record-keeping sections for work completed, costs, warranty cards, sample paint colors, and other pertinent material.

This information can be kept in one or more formats, such as a three-ring binder, file folders, or a computer

database. It is important to keep the files current with completed work forms to facilitate long-term evaluations and planning for future work (Fig 2).

Proper maintenance depends on an organized plan with work prescribed in manageable components. Regular maintenance needs to be considered a priority both in terms of time allotted for inspections and for allocation of funding.

Maintenance work scheduling is generally based on a variety of factors, including the seriousness of the problem, type of work involved, seasonal appropriateness, product manufacturer's recommendations, and staff availability. There are other variables as well. For example, building materials and finishes on southern and western exposures will often weather faster than those on northern or eastern exposures. Horizontal surfaces facing skyward usually require greater maintenance than vertical ones; in regions with moderate or heavy rainfall, wood and other materials in prolonged shadow are subject to more rapid decay.

Maintenance costs can be controlled, in part, through careful planning, identification of the amount of labor required, and thoughtful scheduling of work. Maintenance schedules should take into account daily and seasonal activities of the property in order to maximize the uninterrupted time necessary to complete the work. Institutions generally need to budget annually between 2 and 4 percent of the replacement value of the building to underwrite the expense of full building maintenance.<sup>2</sup> Use of trained volunteers to undertake maintenance can help reduce costs.

Exterior inspections usually proceed from the roof down to the foundation, working on one elevation at

Cyclic Building Inspection Checklist: Horse Stable			Inspection date: 04/24/05	
Building Feature	Material(s)	Condition Description	Maintenance Action Required	Work Done
ROOF:				
Covering	Clay tile	Two slipped tiles	Reattach tiles	5/4/05
	Painted metal standing seam	Slight corrosion; blistering paint on metal roof section	Sand and repaint area that is peeling	6/8/05
Flashing	Painted metal	Flashing in good condition	N/A	N/A
Gutters/Downspouts	6" half round galvanized metal	Gutter sagging; downspouts OK	Realign gutter and put on new hanger strap	5/4/05
			Flush out downspouts	5/5/05
Chimneys	No masonry chimney	N/A	N/A	N/A
Attachments/Penetrations	Metal vent stack and weathervane	Vent stack hood has some peeling paint; vane OK	Sand and repaint vent stack	6/8/05

Figure 2. All personnel associated with a historic structure need to become acquainted with how existing building features should appear and during their daily or weekly routines look for changes that may occur. This will help augment the regular maintenance inspection that will occur at specified intervals based on seasonal changes, use, and other factors. A segment of an inspection form showing the roof elements of a horse stable is shown. The inspection report should be kept along with the maintenance plan and other material in notebook, file or electronic form.



a time, moving around the building in a consistent direction. On the interior, the attic, inside surfaces of exterior walls, and crawlspaces or basements should be examined for signs of potential or existing problems with the building envelope.

The following chart lists suggested inspection frequencies for major features associated with the building's exterior, based on a temperate four-season climate and moderate levels of annual rainfall. For areas of different climate conditions and rainfall, such as in the more arid southwest, the nature of building decay and frequency of inspections will vary. For buildings with certain inherent conditions, heavy use patterns, or locations with more extreme weather conditions, the frequency of inspections should be altered accordingly.

*Note: All building features should be inspected after any significant weather event such as a severe rainstorm or unusually high winds.*

INSPECTION FREQUENCY CHART		
Feature	Minimum Inspection Frequency	Season
Roof	Annually	Spring or fall; every 5 years by roofer
Chimneys	Annually	Fall, prior to heating season; every 5 years by mason
Roof Drainage	6 months; more frequently as needed	Before and after wet season, during heavy rain
Exterior Walls and Porches	Annually	Spring, prior to summer/fall painting season
Windows	Annually	Spring, prior to summer/fall painting season
Foundation and Grade	Annually	Spring or during wet season
Building Perimeter	Annually	Winter, after leaves have dropped off trees
Entryways	Annually; heavily used entries may merit greater frequency	Spring, prior to summer/fall painting season
Doors	6 months; heavily used entry doors may merit greater frequency	Spring and fall; prior to heating/cooling seasons
Attic	4 months, or after a major storm	Before, during and after wet season
Basement/Crawlspace	4 months, or after a major storm	Before, during and after rain season

Survey observations can be recorded on a standardized report form and photographs taken as a visual record. All deficient conditions should be recorded and placed on a written schedule to be corrected or monitored.

## BUILDING COMPONENTS

For purposes of this discussion, the principal exterior surface areas have been divided into five components and are presented in order from the roof down to grade. While guidance for inspection and maintenance is provided for each component, this information is very general in nature and is not indeed to be comprehensive in scope. Examples have been selected to address some typical maintenance needs and to help the reader avoid common mistakes.

### Roofs/chimneys

The roof is designed to keep water out of a building. Thus one of the principal maintenance objectives is to ensure water flows off the roof and into functional gutters and downspouts directly to grade and away from the building—and to prevent water from penetrating the attic, exterior walls, and basement of a building. (Note: Some buildings were designed without gutters and thus assessments must be made as to whether rain water is being properly addressed at the foundation and perimeter grade.) Keeping gutters and downspouts cleared of debris is usually high on the list of regular maintenance activities (Fig 3). Flashing around chimneys, parapets, dormers, and other appendages to the roof also merit regular inspection and appropriate maintenance when needed. The material covering the roof—wood shingles, slate, tile, asphalt, sheet metal, rolled roofing—requires maintenance both to ensure a watertight seal and to lengthen its service life; the type and frequency of maintenance varies with the roofing material. Older chimneys and parapets also require inspection and maintenance. With the exception of cleaning and minor repairs to gutters and downspouts, most roof maintenance work will necessitate use of an outside contractor.

#### Inspection:

The functioning of gutters and downspouts can be safely observed from the ground during rainy weather and when winter ice has collected. Binoculars are a useful tool in helping to identify potential roofing problems from the same safe vantage point. Careful observation from grade helps to identify maintenance needs between close-up inspections by an experienced roofer. Observation from the building interior is also important to identify possible leak locations. When access can be safely gained to the roof, it is important to wear shoes with slip-resistant soles and to use safety ropes.



Figure 3. Keeping gutters clean of debris can be one of the most important cyclical maintenance activities. On this small one-story addition, a garden hose is being used to flush out the trough to ensure that the gutter and downspouts are unobstructed. Gutters on most small and medium size buildings can be reached with an extension ladder and a garden hose. Photo: Bryan Blundell.

Depending on the nature of the roof, some common conditions of concern to look for are:

- sagging gutters and split downspouts;
- debris accumulating in gutters and valleys;
- overhanging branches rubbing against the roof or gutters
- plant shoots growing out of chimneys;
- slipped, missing, cracked, bucking, delaminating, peeling, or broken roof coverings;
- deteriorated flashing and failing connections at any intersection of roof areas or of roof and adjacent wall;
- bubbled surfaces and moisture ponding on flat or low sloped roofs;
- evidence of water leaks in the attic;
- misaligned or damaged elements, such as decorative cresting, lightning rods, or antennas; and
- cracked masonry or dislodged chimney caps.

*Maintenance:*

- Remove leaves and other debris from gutters and downspouts. Utilize a ladder with a brace device, if

necessary, to keep the ladder from crushing the gutter. Use a garden hose to flush out troughs and downspouts. Patch or repair holes in gutters using products such as fiberglass tape and epoxy adhesive in metal gutters. Avoid asphalt compounds since acidic material can cause further deterioration of metal gutters.

- Correct misaligned gutters and adjust, if necessary, so that water flows to drains and does not pond. If gutter edges sag, consider inserting wooden wedges between the fascia board and the back of the gutter to add support. Seal leaking seams or pinholes in gutters and elbows.

- Broom sweep branch or leaf debris away from shingles, valleys, and crickets, particularly around chimneys and dormers.

- Where mechanical equipment is mounted on flat or low-sloped roofs, ensure that access for maintenance

can be provided without damaging the roof. Clean out trapped leaves and debris from around equipment base and consider adding a protective walkway for access.

- Remove biological growth where it is causing erosion or exfoliation of roofing. Use low-pressure garden hose water and a natural or nylon scrubbing brush to remove such growth, scraping with a plastic putty knife or similar wood or plastic tool as needed on heavier buildup. Most growth is acidic and while there are products designed to kill spores, such as diluted chlorine bleach, they should be avoided. Even fairly weak formulas can still cause unexpected color changes, efflorescence, or over-splash damage to plantings or surfaces below the roof. Where appropriate, trim adjacent tree branches to increase sunlight on the roof since sunlight will deter further biological growth.

- Re-secure loose flashing at the dormers, chimneys or parapets. Clean out old mortar, lead, lead wool, or fastening material and make sure that flashing is properly inserted into reglet (slot) joints, taking care not to damage the substrate. Avoid installing new step flashing as a single metal component where multiple pieces are required to provide proper waterproofing. Also avoid attaching step flashing with mastic or sealant. Properly re-bed all step flashing. Use appropriate non-ferrous flashing metal or painted metal if needed. Since cap, step, valley, cricket, and apron flashings each have specific overlap and extension requirements, replacement flashing should match the existing material unless there has been a proven deficiency.



Figure 4. Damage to roofs often requires immediate attention. As a temporary measure, this damaged roof tile could be replaced with a brown aluminum sheet wedged between the existing tiles. Photo: Chad Randl.



Figure 5. The use of a sealant to close an exposed joint is not always an effective long-term solution. Where this decorative wood element connects to the slate roof, the sealant has failed within a short time and a proper metal flashing collar is being fitted instead. Photo: Bryan Blundell.

- Repoint joints in chimneys, parapet, or balustrade capping stones using a hydraulic lime mortar or other suitable mortar where the existing mortar has eroded or cracked, allowing moisture penetration. In general, a mortar that is slightly weaker than the adjacent masonry should be used. This allows trapped moisture in the masonry to migrate out through the mortar and not the masonry. Spalled masonry is often evidence of the previous use of a mortar mix that was too hard.
- Use professional services to repair chimneys and caps. Avoid the use of mortar washes on masonry since they tend to crack, allowing moisture to penetrate and promoting masonry spalling. Repoint masonry with a durable mortar that is slightly weaker than the adjacent masonry. Slope the masonry mortar cap to insure drainage away from the flue. If a chimney rain cap is installed, ensure adequate venting and exhaust.
- As a temporary measure, slip pieces of non-corrosive metal flashing under or between damaged and missing roofing units until new slate, shingles, or tile can be attached. Repair broken, missing or damaged roofing units with ones that match. Follow roofing supplier and industry guidance on inserting and attaching replacement units (Fig 4). Avoid using temporary asphalt patches as it makes a proper repair difficult later on.
- For long-term preservation of wooden shingle roofs coated with a preservative, recoat every few years following the manufacturer's recommendations. Be aware of environmental considerations.
- Scrape and repaint selected areas of coated ferrous metal roofing as needed; repaint on a regularly

scheduled basis. Ferrous metal roofs can last a long time if painted regularly. Alkyd coatings are generally used on metal roofs; be sure to wash and properly prepare the area beforehand. Environmental regulations may restrict the use of certain types of paints. Apply the coating system in accordance with manufacturer's recommendations. Prepare the surface prior to application to obtain good adhesion with the prime coat. Apply both a prime coat and a topcoat for good bonding and coverage; select primer and topcoat products from the same manufacturer.

- Re-secure loose decorative elements, such as finials and weathervanes. Seek professional advice if decorative elements exhibit considerable corrosion, wood rot, or structural instability. Small surface cracks may benefit from a flexible sealant to keep moisture out; sealants have a limited life and require careful inspection and periodic replacement (Fig 5).

## Exterior Walls

Exterior walls are designed to help prevent water infiltration, control air infiltration, and serve as a barrier for unwanted animals, birds and insects. The primary maintenance objective is to keep walls in sound condition and to prevent water penetration, insect infestation, and needless decay (Fig 6). Depending on the materials and construction methods, walls should have an even appearance, free from unwanted cracks, and should be able to shed excess moisture. Where surfaces are significantly misaligned or where there are bulging wall sections

or cracks indicative of potential structural problems, seek professional guidance as to the cause of distress and appropriate corrective measures. Wood-frame construction generally will require more frequent maintenance than buildings constructed of brick, stone, or terra cotta (Fig 7).

*Inspections:*

It is best to inspect walls during dry as well as wet weather. Look for moisture patterns that may appear on the walls after a heavy or sustained rainfall or snow, recording any patterns on elevation drawings or standard recording forms. Monitoring the interior wall for moisture or other potential problems is important as well. Look for movement in cracks, joints, and around windows and doors and try to establish whether movement is seasonal in nature (such as related to shrinkage of wood during dry weather) or signs of an ongoing problem. For moderate size buildings, a ladder or mechanical lift may be necessary, though in some cases the use of binoculars and observations made from windows and other openings will be sufficient. When examining the walls, some common conditions of concern to look for are:

- Misaligned surfaces, bulging wall sections, cracks in masonry units, diagonal cracks in masonry joints, spalling masonry, open joints, and nail popping;
- Evidence of wood rot, insect infestation, and potentially damaging vegetative growth;
- Deficiencies in the attachment of wall mounted lamps, flag pole brackets, signs, and similar items;
- Potential problems with penetrating features such as water spigots, electrical outlets, and vents;
- Excessive damp spots, often accompanied by staining, peeling paint, moss, or mold; and
- General paint problems (Fig 8).

*Maintenance:*

- Trim tree branches away from walls. Remove ivy and tendrils of climbing plants by first cutting at the base of the vine to allow tendrils to die back, and later using a plastic scraper to dislodge debris and an appropriate digging tool to dislodge and remove root systems. Be cautious if using a commercial chemical to accelerate root decay; follow safety directions and avoid contact of chemicals with workers and wall materials.
- Wash exterior wall surfaces if dirt or other deposits are causing damage or hiding deterioration; extend



Figure 6. Stucco applied to an exterior wall or foundation was intended to function as a watertight surface. Unless maintained, rainwater will penetrate open joints and cracks that may occur over time. A spalled section of stucco indicates some damage has occurred and a wooden mallet is being used to tap the surface to determine whether the immediate stucco has lost adhesion. Photo: Bryan Blundell.



Figure 7. One of the advantages of wood shingles as a wall covering is that individual shingles that are damaged can easily be replaced. On this highly exposed corner, worn shingles have been selectively replaced to help safeguard against water damage. The new shingles will be stained to match the existing shingles.



Figure 8. The paint on the siding of this south-facing wall needs to be scraped, sanded, primed and repainted. Postponing such work will lead to further paint failure, require greater preparatory costs, and could even result in the need to replace some siding. Photo: Charles Fisher.



*Figure 9. To help extend a repainting cycle, dirt and spider webs should be removed before permanent staining occurs. In this case, a natural bristle brush and a soft damp cloth are being used to remove insect debris and refresh the surface appearance.*

scheduled times for cleaning for cosmetic purposes to reduce frequency (Fig 9). When cleaning, use the gentlest means possible; start with natural bristle brushes and water and only add a mild phosphate-free detergent if necessary. Use non-abrasive cleaning methods and low-pressure water from a garden hose. For most building materials, such as wood and brick, avoid abrasive methods such as mechanical scrapers and high-pressure water or air and such additives as sand, natural soda, ice crystals, or rubber products. All abrasives remove some portion of the surface and power-washing drives excessive moisture into wall materials and even into wall cavities and interior walls. If using a mild detergent, two people are recommended, one to brush and one to prewet and rinse. When graffiti or stains are present, consult a preservation specialist who may use poultices or mild chemicals to remove the stain. If the entire building needs cleaning other than described above, consult a specialist.

- Repoint masonry in areas where mortar is loose or where masonry units have settled. Resolve cause of cracks or failure before resetting units and repointing. Rake out joints by hand, generally avoiding rotary saws or drills, to a depth of 2 ½ times the width of the joint (or until sound mortar is encountered), to make sure that fresh mortar will not pop out. Repointing mortar should be lime-rich and formulated to be slightly weaker than the masonry units and to match the historic mortar in color, width, appearance, and tooling. Off-the-shelf pre-mixed cement mortars are not appropriate for most historic buildings. Avoid use of joint sealants in place of

mortar on vertical masonry wall surfaces, as they are not breathable and can lead to moisture-related damage of the adjacent masonry (Fig 10).

- Correct areas that trap unwanted moisture. Damaged bricks or stone units can sometimes be removed, turned around, and reset, or replaced with salvaged units. When using traditional or contemporary materials for patching wood, masonry, metal, or other materials, ensure that the materials are compatible with the substrate; evaluate strength, vapor permeability, and thermal expansion, as well as appearance.
- When patching is required, select a compatible patch material. Prepare substrate and install patch material according to manufacturer's recommendations; respect existing joints. Small or shallow surface defects may not require patching; large or deep surface defects may be better addressed by installation of a dutchman unit than by patching.
- Where a damaged area is too large to patch, consider replacing the section with in-kind material. For stucco and adobe materials, traditional patching formulas are recommended.
- When temporarily removing wood siding to repair framing or to tighten corner boards and loose trim, reuse the existing siding where possible. Consider using stainless steel or high strength aluminum nails as appropriate. Putty or fill nail holes flush with siding prior to repainting. Back-prime any installed wood with



Figure 10. Repointing of masonry should usually be approached as repair rather than maintenance work in part because of the need for a skilled mason familiar with historic mortar. In this case, a moisture condition was not corrected and the use of a waterproof coating and off-the-shelf Portland cement mortar trapped water and resulted in further damage to these 19th century bricks. Photo: NPS files.

one coat of primer and coat end grain that might be exposed with two coats of primer.

- Prepare, prime, and spot paint areas needing repainting. Remember that preparation is the key to a successful long lasting paint job. Ensure beforehand the compatibility of new and existing paints to avoid premature paint failure. Remove loose paint to a sound substrate; sand or gently rough surface if needed for a good paint bond; wipe clean; and repaint with appropriate primer and topcoats. Follow manufacturer’s recommendations for application of coatings, including temperature parameters for paint application. Use top quality coating materials. Generally paint when sun is not shining directly onto surfaces to be painted.

- Remove deteriorated caulks and sealants, clean, and reapply appropriate caulks and sealants using backer rods as necessary. Follow manufacturer’s instructions regarding preparation and installation.

- Correct deficiencies in any wall attachments such as awning and flag pole anchors, improperly installed electrical outlets, or loose water spigots.

### Openings

Exterior wall openings primarily consist of doors, windows, storefronts, and passageways. The major maintenance objectives are to retain the functioning nature of the opening and to keep in sound condition the connection between the opening and the wall in order to reduce air and water infiltration.

### Inspection:

Wall openings are typically inspected from inside as well as out. Examinations should include the overall material condition; a check for unwanted water penetration, insect infiltration, or animal entry; and identification of where openings may not be properly functioning. Frames should be checked to make sure they are not loose and to ascertain whether the intersection between the wall and the frame is properly sealed. Secure connections of glazing to sash and between sash and frames are also important. Particular attention should be placed on exposed horizontal surfaces of storefronts and window frames as they tend to deteriorate much faster than vertical surfaces. Inspections should identify:

- loose frames, doors, sash, shutters, screens, storefront components, and signs that present safety hazards;
- slipped sills and tipped or cupped thresholds;
- poorly fitting units and storm assemblies, misaligned frames, drag marks on thresholds from sagging doors and storm doors;
- loose, open, or decayed joints in door and window frames, doors and sash, shutters, and storefronts;
- loose hardware, broken sash cords/chains, worn sash pulleys, cracked awning, shutter and window hardware, locking difficulties, and deteriorated weatherstripping and flashing;
- broken/cracked glass, loose or missing glazing and putty;
- peeling paint, corrosion or rust stains; and
- window well debris accumulation, heavy bird droppings, and termite and carpenter ant damage.

### Maintenance:

- Replace broken or missing glass as soon as possible; in some cases cracked glass may be repaired using specialty glues. For historic crown glass and early cylinder glass, a conservation approach should be considered to repair limited cracks. Where panes with a distinct appearance are missing, specialty glass should be obtained to match, with sufficient inventory kept for future needs. Avoid using mechanical devices to remove old putty and match historic putty bevels or details when undertaking work.

- Reputty window glazing where putty is deteriorated or missing. Take care in removing putty so as not to crack or break old glass or damage muntins and sash frames. Re-glaze with either traditionally formulated

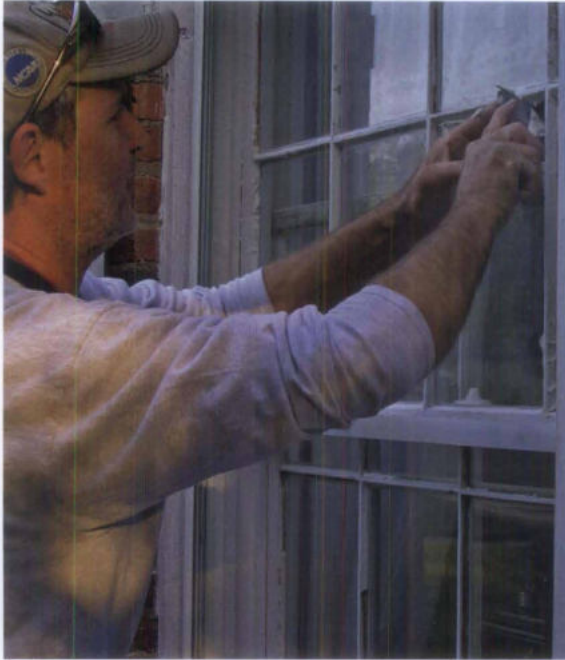


Figure 11. Glazing putty should be maintained in sound condition to prevent unwanted air infiltration and water damage. New glazing putty should be pulled tight to the glass and edge of the wood, creating a clean bevel that matches the historic glazing.

oil putties or modern synthetic ones, making sure to properly bed the glass and secure with glazing points (Fig 11).

- Clean window glass, door glazing, storefronts, transom prism lights, garage doors, and storm panels using a mild vinegar and water mixture or a non-alkaline commercial window cleaner. Be cautious with compounds that contain ammonia as they may stain brass or bronze hardware elements if not totally removed. When using a squeegee blade or sponge, wipe wet corners with a soft dry cloth. Avoid high-pressure washes.

- Clean handles, locks and similar hardware with a soft, damp cloth. Use mineral spirits or commercial cleaners very sparingly, as repeated use may remove original finishes. Most metal cleaners include ammonia that can streak and stain metal, so it is important to remove all cleaning residue. Polished hardware subject to tarnishing or oxidation, particularly doorknobs, often benefits from a thin coat of paste wax (carnauba), hand buffed to remove extra residue. Avoid lacquer finishes for high use areas, as they require more extensive maintenance. Patinated finishes should not be cleaned with any chemicals, since the subtle aged appearance contributes to the building's character.

- Remove and clean hardware before painting doors and windows; reinstall after the paint has dried.
- Tighten screws in doorframes and lubricate door hinges, awning hardware, garage door mechanisms, window sash chains, and pulleys using a graphite or silicone type lubricant.

### Contracting Maintenance and Repair Work

Many contractors are very proficient in using modern construction methods and materials; however, they may not have the experience or skill required to carry out maintenance on historic buildings. The following are tips to use when selecting a contractor to work on your historic building:

1. Become familiar with work done on similar historic properties in your area so that you can obtain names of possible preservation contractors.
2. Be as specific as possible in defining the scope of work you expect to undertake.
3. Ask potential contractors for multiple references (three to five) and visit previous work sites. Contact the building owner or manager and ask how the job proceeded; if the same work crew was retained from start to finish; if the workers were of a consistent skill level; whether the project was completed in a reasonable time; and whether the person would use the contractor again.
4. Be familiar with the preservation context of the work to be undertaken. Use the written procedures in your maintenance plan to help define the scope of work in accordance with preservation standards and guidelines. Always request that the gentlest method possible be used. Use a preservation consultant if necessary to ensure that the work is performed in an appropriate manner.
5. Request in the contract proposal a detailed cost estimate that clearly defines the work to be executed, establishes the precautions that will be used to protect adjoining materials, and lists specific qualified subcontractors, if any, to be used.
6. Insure that the contractor has all necessary business licenses and carries worker compensation.

- Check weather stripping on doors and windows and adjust or replace as necessary. Use a durable type of weather stripping, such as spring metal or high quality synthetic material, avoiding common brush and bulb or pile weather stripping that require more frequent replacement.

- Adjust steel casement windows as needed for proper alignment and tight fit. Avoid additional weather stripping as this may lead to further misalignment, creating pathways for air and water infiltration.

- Check window sills for proper drainage. Fill cracks in wood sills with a wood filler or epoxy. Follow manufacturer's instructions for preparation and installation. Do not cover over a wood sill with metal panning, as it may trap moisture and promote decay.

- Repair, prime, and repaint windows, doors, frames, and sills when needed. Clean out putty debris and paint chips from windows using a wet paper towel and dispose of debris prior to repair or repainting. Take appropriate additional precautions when removing lead-based paint. Sand and prepare surfaces and use material-specific patching compounds to fill any holes or areas collecting moisture (Fig 12). Avoid leaving exposed wood unpainted for any length of time, as light will degrade the wood surface and lead to premature failure of subsequent paint applications. Immediately prime steel sash after paint is removed and the substrate prepared for repainting.

- Adjust wood sash that bind when operated. Apply beeswax, paraffin, or similar material to tracks or sash runs for ease of movement. If sash are loose, replace worn parting beads. Sash runs traditionally were unpainted between the stop and parting bead; removing subsequent paint applications will often help improve sash operation.

- Correct perimeter cracks around windows and doors to prevent water and air infiltration. Use traditional material or modern sealants as appropriate. If fillers such as lead wool have been used, new wool can be inserted with a thin blade tool, taking care to avoid damage to adjacent trim. Reduce excess air infiltration around windows by repairing and lubricating sash locks so that windows close tightly.



Figure 12. Good surface preparation is essential for long lasting paint. Scraping loose paint, filling nail holes and cracks, sanding, and wiping with a damp cloth prior to repainting are all important steps whether touching up small areas or repainting an entire feature. Always use a manufacturer's best quality paint. Windows and shutters may need repainting every five to seven years, depending on exposure and climate.



Figure 13. Window air conditioning units can cause damage to surfaces below when condensation drips in an uncontrolled manner. Drip extension tubes can sometimes be added to direct the discharge.



- Remove debris beneath window air conditioning units and ensure that water from units does not drain onto sills or wall surfaces below (Fig 13). Removal of air conditioning units when not in season is recommended.
- Adjust storm panels and clean weep holes; check that weep holes at the bottom of the panels are open so water will not be trapped on the sill. Exterior applied storm windows are best attached using screws and not tightly adhered with sealant. Use of sealant makes storm units difficult to remove for maintenance and can contribute to moisture entrapment if weep holes become clogged.
- Remove weakened or loose shutters and store for later repair. Consider adding a zinc or painted metal top to shutters as a protective cap to cover the wood's exposed end grain. This will extend the life of the shutters.

## Projections

Numerous projections may exist on a historic building, such as porches, dormers, skylights, balconies, fire escapes, and breezeways. They are often composed of several different materials and may include an independent roof. Principal maintenance objectives include directing moisture off these features and keeping weathered surfaces in good condition. Secondary projections may include brackets, lamps, hanging signs, and similar items that tend to be exposed to the elements.

### Inspection:

In some cases, projections are essentially independent units of a building and so must be evaluated carefully for possible settlement, separation from the main body of the building, and materials deterioration. Some electrical features may require inspection by a electrician or service technician. Common conditions of concern to look for are:

- damaged flashing or tie-in connections of projecting elements;
- misaligned posts and railings;
- deteriorated finishes and materials, including peeling paint, cupped and warped decking, wood deterioration, and hazardous steps;
- evidence of termites, carpenter ants, bees, or animal pests (Fig 14);
- damaged lamps, unsafe electrical outlets or deteriorated seals around connections;
- loose marker plaques, sign, or mail boxes; and

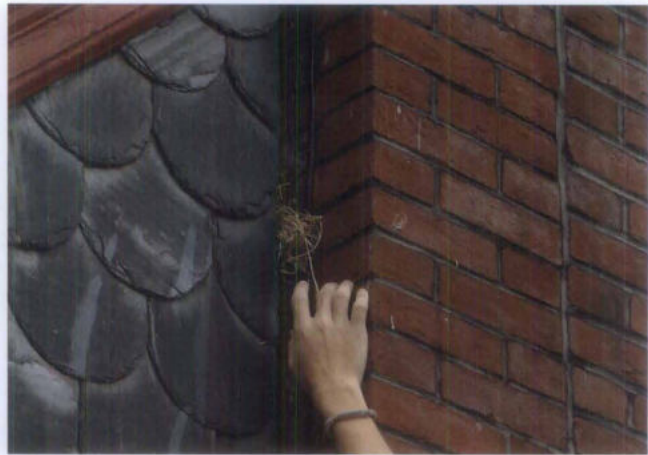


Figure 14. When inspecting connections between projections and the main building, look for areas where birds, bees and pests may enter or nest. Birds have been nesting in this porch roof and the area is being cleaned of their debris. Where an opening exists, it may be necessary to cover it with a trim piece, screening, or sealant. Photo: Bryan Blundell.

- rust and excessive wear of structural, anchorage, and safety features of balconies and fire escapes.

### Maintenance:

- Selectively repair or replace damaged roofing units on porches and other projections. Ensure adequate drainage away from the building. Repair flashing connections as needed; clean and seal open joints as appropriate.
- Secure any loose connections, such as on porch rails or fire escapes.
- Maintain ferrous metal components by following manufacturer's recommendation for cleaning and repainting. Remove rust and corrosion from porch handrails, balconies, fire escapes, and other metal features; prepare, prime, and repaint using a corrosion-inhibitive coating system. Apply new primer before new corrosion sets in, followed by new topcoat. Take appropriate safety measures when dealing with existing lead-based paint and in using corrosion-removal products (Fig 15).
- Reattach loose brackets, lamps, or signs. With electrical boxes for outlets or lighting devices, ensure that cover plates are properly sealed. Prime and paint metal elements as needed.
- Keep porch decks and steps free from dust, dirt, leaf debris, and snow as soon as it accumulates using a broom or plastic blade shovel.
- Repair areas of wood decay or other damage to railings, posts, and decorative elements. Repair with wood dutchman, wood putty, or epoxy filler, as appropriate; replace individual elements as needed.



Figure 15. Metal projecting elements on a building, such as sign armatures and railings, are easily subject to rust and decay. Proper surface preparation to remove rust is essential. Special metal primers and topcoats should be used.

Prime and repaint features when necessary and repaint horizontal surfaces on a more frequent basis.

- Sand and repaint porch floorboards to keep weather surfaces protected. The exposed ends of porch floorboards are especially susceptible to decay and may need to be treated every year or two.
- Carefully cut out damaged or buckled porch flooring and replace with wood to match. Back-prime new wood that is being installed; treat end grain with wood preservative and paint primer. Ensure that new wood is adequately kiln or air-dried to avoid shrinkage and problems with paint adherence.
- Repair rotted stair stringers; adjust grade or add stone pavers at stair base to keep wooden elements from coming into direct contact with soil.
- Consider durable hardwoods for replacement material where beading, chamfering, or other decorative work is required in order to match existing features being replaced. Although appropriate for certain applications, pressure treated lumber is hard to tool and may inhibit paint adherence if not allowed to weather prior to coating application.
- Clean out any debris from carpenter bees, ants, termites, and rodents, particularly from under porches. Replace damaged wood and add screening or lattice to discourage rodents. Consider treating above ground features with a borate solution to deter termites and wood rot and repaint exposed surfaces.

### Foundations and Perimeter Grades

The foundation walls that penetrate into the ground, the piers that support raised structures, and the ground immediately around a foundation (known as grade) serve important structural functions. To help sustain these functions, it is important that there is

good drainage around and away from the building. The maintenance goal is to prevent moisture from entering foundations and crawl spaces and damaging materials close to the grade, and to provide ventilation in damp areas.

#### Inspection:

Inspections at the foundation should be done in conjunction with the inspection of the downspouts to ensure that water is being discharged a sufficient distance from the building perimeter to avoid excessive dampness in basements or crawl spaces. In addition, crawl spaces should be adequately vented to deter mold and decay and should be screened or otherwise secured against animals. Look for:

- depressions or grade sloping toward the foundation; standing water after a storm;



Figure 16. This chronically wet area has a mildew bloom brought on by heat generated from the air-conditioning condenser unit. The dampness could be caused by a clogged roof gutter, improper grading, or a leaking hose bibb.

## Sealants and Caulks

Using sealants and caulks has become a familiar part of exterior maintenance today. As the use of precision joinery and certain traditional materials to render joints more weathertight has waned in recent years, caulks and more often elastomeric sealants are used to seal cracks and joints to keep out moisture and reduce air infiltration. Where cracks and failing joints are indicators of a serious problem, sealants and caulks may be used as a temporary measure. In some cases they may actually exacerbate the existing problem, such as by trapping moisture in adjacent masonry, and lead to more costly repairs.

Manufacturer's recommendations provide instructions on the proper application of caulks and sealants. Special attention should be placed on ensuring that the subsurface or joint is properly prepared and cleaned. Backer rods may be necessary for joints or cracks. Tooling of the caulk or sealant is usually necessary to ensure contact with all edge surfaces and for a clean and consistent appearance.

Caulks generally refer to older oil resin-based products, which have relatively limited life span and limited flexibility. Contemporary elastomeric sealants are composed of polymer synthetics. Elastomeric sealants are more durable than caulks and have greater flexibility and wider application. Caulks and sealants can become maintenance problems, as they tend to deteriorate faster than their substrates and must be replaced periodically as a part of cyclical maintenance of the structure.

The selection criteria for caulks and sealants include type of substrate, adhesion properties, size and configuration of joint, intended appearance/color and paintability, movement characteristics, and service life. Both one-part and two-part sealants are available; the latter require mixing as part of the application process. Sealants are commonly used for a variety of places on the exterior of a building such as around windows and doors, at interfaces between masonry and wood, between various wood features or elements, and at attachments to or through walls or roofs, such as with lamps, signs, or exterior plumbing fixtures. Their effectiveness depends on numerous factors including proper surface preparation and application. Applications of sealants and caulks should be examined as part of routine maintenance inspection, irrespective of their projected life expectancy.

Installation of caulks and sealants often can be undertaken by site personnel. For large and more complex projects, a contractor experienced in sealant installation may be needed. In either case, the sealant manufacturer should be consulted on proper sealant selection, preparation, and installation procedures.

- material deterioration at or near the foundation, including loss of mortar in masonry, rotting wood clapboards, or settlement cracks in the lower sections of wall;
- evidence of animal or pest infestation;
- vegetation growing close to the foundation, including trees, shrubs and planting beds;
- evidence of moisture damage from lawn and garden in-ground sprinkler systems;
- evidence of moss or mold from damp conditions or poorly situated downspout splash blocks (Fig 16); and
- blocked downspout drainage boots or clogged areaway grates.

### *Maintenance:*

- Remove leaves and other debris from drains to prevent accumulation. Detach drain grates from paved areas and extract clogged debris. Flush with a hose to ensure that there is no blockage. Use a professional drain service to clear obstructions if necessary.
- Conduct annual termite inspections. Promptly address termite and other insect infestations. Use only licensed company for treatment where needed.
- Keep the grade around the foundation sloping away from the building. Add soil to fill depressions particularly around downspouts and splash blocks. Make sure that soil does not come too close to wooden or metal elements. A 6" separation between wooden siding and the grade is usually recommended.
- Avoid use of mulching material immediately around foundations as such material may promote termite infestation, retain moisture or change existing grade slope.
- Reset splash blocks at the end of downspouts or add extender tubes to the end of downspouts as necessary (Fig 17).
- Lubricate operable foundation vent grilles to facilitate seasonal use; paint as needed.
- Manage vegetation around foundations to allow sufficient air movement for wall surfaces to dry out during damp periods. Trim plantings and remove weeds and climbing vine roots. Be careful not to scar foundations or porch piers with grass or weed cutting equipment. If tree roots appear to be damaging a foundation wall, consult an engineer as well as a tree company.

- Wash off discoloration on foundations caused by splash-back, algae, or mildew. Use plain water and a soft natural or nylon bristle brush. Unless thoroughly researched and tested beforehand on a discreet area of the wall, avoid chemical products that may discolor certain types of stone. If cleaning products are used, test beforehand in a discreet area; and avoid over splash to plantings and adjacent building materials.
- Selectively repoint unit masonry as needed. Follow guidance under the wall section in regard to compatible mix, appearance, and texture for pointing mortar.
- Avoid using salts for de-icing and fertilizers with a high acid or petro-chemical content around foundations, as these materials can cause salt contamination of masonry. Use sand or organic materials without chloride additives that can damage masonry. Where salt is used on icy walks, distribute it sparingly and sweep up residual salt after walks have dried.
- Use snow shovels and brooms to clean snow from historic paths and walkways. Avoid blade-type snow removers as they may chip or abrade cobblestones, brick, or stone paving. Note that use of steel snow removal tools in areas where salt-containing snow melters are used may result in rust staining from steel fragments left on the paving.

## Conclusion

Maintenance is the most important preservation treatment for extending the life of a historic property. It is also the most cost effective. Understanding the construction techniques of the original builders and the performance qualities of older building materials, using traditional maintenance and repair methods, and selecting in-kind materials where replacements are needed will help preserve the building and its historic character.

Maintenance can be managed in small distinct components, coordinated with other work, and scheduled over many years to ensure that materials are properly cared for and their life span maximized. A written maintenance plan is the most effective way to organize, schedule, and guide the work necessary to properly care for a historic building. The maintenance plan should include a description of the materials and methods required for each task, as well as a schedule for work required for maintenance of different building materials and components.

Historic house journals, maintenance guides for older buildings, preservation consultants, and preservation maintenance firms can assist with writing appropriate procedures for specific properties. Priorities should be established for intervening when unexpected damage occurs such as from broken water pipes or high winds.



Figure 17. Extending downspouts at their base is one of the basic steps to reduce dampness in basements, crawl spaces and around foundations. Extensions should be buried, if possible, for aesthetics, ease of lawn care, and to avoid creating a tripping hazard. Photo: NPS files.

Worker safety should always be paramount. When work is beyond the capabilities of in-house personnel and must be contracted, special efforts should be made to ensure that a contractor is both experienced in working with historic buildings and utilizes appropriate preservation treatments.

A well-maintained property is a more valuable property and one that will survive as a legacy for generations to come.

## Endnotes

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## Acknowledgements

Sharon C. Park FAIA, is the former Chief of Technical Preservation Services, Heritage Preservation Services, National Park Service, in Washington, D.C. and currently is the Associate Director for Architectural History and Historic Preservation, Smithsonian Institution.

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This publication has been prepared pursuant to the National Historic Preservation Act, as amended, which directs the Secretary of the Interior to develop and make available information concerning historic properties. Comments about this publication should be made to: Charles Fisher, Technical Publications Program Manager, Technical Preservation Services-2255, National Park Service, 1849 C Street, NW, Washington, D.C. 20240. Additional information offered by Technical Preservation Services is available on our website at <[www.nps.gov/history/hps/tps](http://www.nps.gov/history/hps/tps)>. This publication is not copyrighted and can be reproduced without penalty. Normal procedures for credit to the author and the National Park Service are appreciated. Unless otherwise noted, photographs in this Brief are by Sharon C. Park, FAIA. Except for the author's photos, the photographs used in this publication may not be used to illustrate other publications without permission of the owner.

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June 2007

## Technical Preservation Services

National Park Service  
U.S. Department of the Interior



[Home](#) > [The Standards](#) > Four Approaches to the Treatment of Historic Properties

### Four Approaches to the Treatment of Historic Properties

There are Standards for four distinct, but interrelated, approaches to the treatment of historic properties—**preservation**, **rehabilitation**, **restoration**, and **reconstruction**.

[Standards for Preservation](#)

[Standards for Rehabilitation](#)

[Standards for Rehabilitation](#)

(for historic tax credit projects)

[Standards for Restoration](#)

[Standards for Reconstruction](#)

[History of the Standards](#)

[Guidelines for the Treatment of Historic Properties](#)

[Guidelines for the Treatment of Cultural Landscapes](#)

[Guidelines for Rehabilitating Historic Buildings](#)

[Guidelines on Sustainability](#)

[Guidelines on Flood Adaptation for Rehabilitating Historic Buildings](#)



**Choosing an appropriate treatment for a historic building or landscape is critical.**

**Preservation** focuses on the maintenance and repair of existing historic materials and retention of a property's form as it has evolved over time.

**Rehabilitation** acknowledges the need to alter or add to a historic property to meet continuing or changing uses while retaining the property's historic character.

**Restoration** depicts a property at a particular period of time in its history, while removing evidence of other periods.

**Reconstruction** re-creates vanished or non-surviving portions of a property for interpretive purposes.

The choice of treatment depends on a variety of factors, including the property's **historical significance, physical condition, proposed use, and intended interpretation**. Historic buildings are used as an example below. The decisionmaking process would be similar for other property types.

**Relative importance in history.** Is the building nationally significant? Is it a rare survivor or the work of a master architect or craftsman? Did an important event take place in it? National Historic Landmarks, designated for their "exceptional significance in American history," or many buildings individually listed in the National Register often warrant Preservation or Restoration. Buildings that contribute to the significance of a historic district but are not individually listed in the National Register more frequently undergo Rehabilitation for a compatible new use.

**Physical condition.** What is the existing condition, or degree of material integrity, of the building prior to work? Has the original form survived largely intact or has it been altered over time? Are the alterations an important part of the building's history? Preservation may be appropriate if distinctive materials, features, and spaces are essentially intact and convey the building's historical significance. If the building requires more extensive repair and replacement, or if alterations or additions are necessary for a new use, then Rehabilitation is probably the most appropriate treatment.

**Proposed use.** An essential, practical question to ask is: Will the building be used as it was historically or will it be given a new use? Many historic buildings can be adapted for new uses without seriously damaging their historic character. However, special-use properties such as grain silos, forts, ice houses, or windmills may be extremely difficult to adapt to new uses without major intervention and a resulting loss of historic character and even integrity.

**Mandated code requirements.** Regardless of the treatment, code requirements will need to be taken into consideration. But if hastily or poorly designed, code-required work may jeopardize a building's materials as well as its historic character. Thus, if a building needs to be seismically upgraded, modifications to the historic appearance should be minimal. Abatement of lead paint and asbestos within historic buildings requires particular care if important historic finishes are not to be adversely affected. Finally, alterations and new construction needed to meet accessibility requirements under the Americans with Disabilities Act of 1990 should be designed to minimize material loss and visual change to a historic building.

The [Guidelines for the Treatment of Historic Properties](#) illustrate the practical application of each treatment to historic properties.

The [Guidelines for the Treatment of Cultural Landscapes](#) apply the treatment standards to historic cultural landscapes.



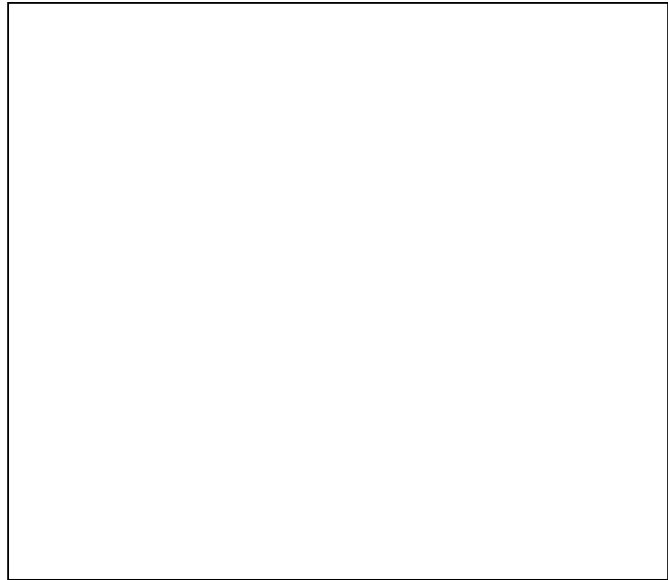
**Michigan SHPO Architectural Properties Identification Form**  
Property Overview and Location

Street Address					
City/Township, State, Zip Code					
County					
Assessor's Parcel #					
Latitude/Longitude (to the 6 <sup>th</sup> decimal point)		Lat:		Long:	
Ownership	Private <input type="checkbox"/>	Public-Local <input type="checkbox"/>	Public-State <input type="checkbox"/>	Public-Federal <input type="checkbox"/>	Multiple <input type="checkbox"/>

**Property Type**

(Insert primary photograph below.)

Building <input type="checkbox"/> select sub-type below	Structure <input type="checkbox"/>
Commercial <input type="checkbox"/>	Object <input type="checkbox"/>
Residential <input type="checkbox"/>	
Industrial <input type="checkbox"/>	
Other <input type="checkbox"/>	



**Architectural Information**

Construction Date	
Architectural Style	
Building Form	
Roof Form	
Roof Materials	
Exterior Wall Materials	
Foundation Materials	
Window Materials	
Window Type	
Outbuildings	Yes <input type="checkbox"/> No <input type="checkbox"/>
Number/Type:	

**Eligibility**

Individually Eligible	Criterion A <input type="checkbox"/>	Criterion B <input type="checkbox"/>	Criterion C <input type="checkbox"/>	Criterion D <input type="checkbox"/>
Criteria Considerations:	a. <input type="checkbox"/> b. <input type="checkbox"/> c. <input type="checkbox"/> d. <input type="checkbox"/> e. <input type="checkbox"/> f. <input type="checkbox"/> g. <input type="checkbox"/>			
Component of a Historic District	Contributing to a district <input type="checkbox"/>	Non-contributing to a district <input type="checkbox"/>	Historic District Name:	
Not Eligible <input type="checkbox"/>				
Area(s) of Significance				
Period(s) of Significance				
Integrity – Does the property possess integrity in all or some of the 7 aspects?				
Location <input type="checkbox"/>	Design <input type="checkbox"/>	Materials <input type="checkbox"/>	Workmanship <input type="checkbox"/>	Setting <input type="checkbox"/> Feeling <input type="checkbox"/> Association <input type="checkbox"/>
General Integrity:	Intact <input type="checkbox"/>	Altered <input type="checkbox"/>	Moved <input type="checkbox"/>	Date(s):
Historic Name				
Current/Common Name				
Historic/Original Owner				
Historic Building Use				
Current Building Use				
Architect/Engineer/Designer				
Builder/Contractor				

Survey Date		Recorded By		Agency Report #	
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For SHPO Use Only	SHPO Concurrence?: Y / N	Date:
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Form date: 6/25/2019



## Appendix E: Michigan SHPO Architectural Properties Identification Form

### **Narrative Architectural Description**

*Provide a detailed description of the property, including all character defining features and any accessory resources.*

### **History of the Resource**

*Provide information on previous owners, land use, construction and alteration dates in a narrative format. This is required for all intensive level surveys and designation and recommended for other identification efforts.*

### **Statement of Significance/Recommendation of Eligibility**

*Provide a detailed explanation of the property's eligibility for the National Register, including an evaluation under at least one of the four criteria, discussion of the seven aspects of integrity, and recommendations about eligibility. This is required for all properties.*

### **References**

*List references used to research and evaluate the individual property.*

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OFFICE OF SAFETY

## Proven Safety Countermeasures

### SPEED MANAGEMENT



**Speed Safety Cameras**



**Variable Speed Limits**



**Appropriate Speed Limits for All Road Users**

### ROADWAY DEPARTURE



**Wider Edge Lines**



**Enhanced Delineation for Horizontal Curves**



**Longitudinal Rumble Strips and Stripes on Two-Lane Roads**



**SafetyEdge<sup>SM</sup>**



**Roadside Design Improvements at Curves**



**Median Barriers**

### INTERSECTIONS



**Backplates with Retroreflective Borders**



**Corridor Access Management**



**Dedicated Left- and Right-Turn Lanes at Intersections**



**Reduced Left-Turn Conflict Intersections**



**Roundabouts**



**Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections**



**Yellow Change Intervals**

### PEDESTRIANS/BICYCLES



**Crosswalk Visibility Enhancements**



**Bicycle Lanes**



**Rectangular Rapid Flashing Beacons (RRFB)**



**Leading Pedestrian Interval**



**Medians and Pedestrian Refuge Islands in Urban and Suburban Areas**



**Pedestrian Hybrid Beacons**



**Road Diets (Roadway Reconfiguration)**



**Walkways**

### CROSSCUTTING



**Pavement Friction Management**



**Lighting**



**Local Road Safety Plans**



**Road Safety Audit**



### Safety Benefits:

Traffic fatalities in the City of Seattle decreased 26 percent after the city implemented comprehensive, city-wide speed management strategies and countermeasures inspired by Vision Zero. This included setting speed limits on all non-arterial streets at 20 mph and 200 miles of arterial streets at 25 mph.<sup>5</sup>

One study found that on rural roads, when considering other relevant factors in the engineering study along with the speed distribution, setting a speed limit no more than 5 mph below the 85th-percentile speed may result in fewer total and fatal plus injury crashes, and lead to drivers complying closely with the posted speed limit.<sup>6</sup>

**For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures/> and [https://safety.fhwa.dot.gov/speedmgt/ref\\_mats/](https://safety.fhwa.dot.gov/speedmgt/ref_mats/).**

FHWA-SA-21-034

## Appropriate Speed Limits for All Road Users

See MCL 257.627 and 257.628 for setting speed limits in Michigan

There is broad consensus among global roadway safety experts that speed control is one of the most important methods for reducing fatalities and serious injuries. Speed is an especially important factor on non-limited access roadways where vehicles and vulnerable road users mix.

A driver may not see or be aware of the conditions within a corridor, and may drive at a speed that feels reasonable for themselves but may not be for all users of the system, especially vulnerable road users, including children and seniors. A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them.<sup>1</sup> At 20 miles per hour, that percentage drops to 5 percent.<sup>1</sup> A number of cities across the United States, including New York, Washington, Seattle and Minneapolis, have reduced their local speed limits in recent years in an effort to reduce fatalities and serious injuries, with most having to secure State legislative authorization to do so.

States and local jurisdictions should set appropriate speed limits to reduce the significant risks drivers impose on others—especially vulnerable road users—and on themselves. Addressing speed is fundamental to the Safe System Approach to making streets safer, and a growing body of research shows that speed limit changes alone can lead to measurable declines in speeds and crashes.<sup>2</sup>

### Applications

Posted speed limits are often the same as the legislative statutory speed limit. Agencies with designated authorities to set speed limits, which include States, and sometimes local jurisdictions, can establish non-statutory speed limits or designate reduced speed zones, and a growing number are doing so. While non-statutory speed limits must be based on an engineering study, conducted in accordance with the *Manual on Uniform Traffic Control Devices (MUTCD)* involving multiple factors and engineering judgment, FHWA is also encouraging agencies to use the following:<sup>3</sup>

- Expert Systems tools.
  - [USLIMITS2](#).
  - [NCHRP 966: Posted Speed Limit Setting Procedure and Tool](#).
- Safe System approach.

Based on international experience and implementation in the United States, the use of 20 mph speed zones or speed limits in urban core areas where vulnerable users share the road environment with motorists may result in further safety benefits.<sup>4</sup>

<sup>1</sup> Reducing the speed limit to 20 mph in urban areas: Child deaths and injuries would be decreased.

<sup>2</sup> Lowering the speed limit from 30 to 25 mph in Boston: effects on vehicle speeds.

<sup>3</sup> FHWA's Methods and Practices for Setting Speed Limits: An Informational Report. (2012).

<sup>4</sup> Recommendations of the Academic Expert Group for the 3rd Global Ministerial Conference on Road Safety.

<sup>5</sup> [https://safety.fhwa.dot.gov/speedmgt/ref\\_mats/fhwasa20047/sec8.cfm#foot813](https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa20047/sec8.cfm#foot813).

<sup>6</sup> Safety and Operational Impacts of Setting Speed Limits below Engineering Recommendations.

### Considerations

When setting a speed limit, agencies should consider a range of factors such as pedestrian and bicyclist activity, crash history, land use context, intersection spacing, driveway density, roadway geometry, roadside conditions, roadway functional classification, traffic volume, and observed speeds.

To achieve desired speeds, agencies often implement other speed management strategies concurrently with setting speed limits, such as self-enforcing roadways, traffic calming, and speed safety cameras. Additional information is in the following FHWA resources:

- [FHWA Speed Management website](#).
- [Self-Enforcing Roadways: A Guidance Report](#).
- [Noteworthy Speed Management Practices](#).
- [Jurisdiction Speed Management Action Plan Development Package](#).
- [Traffic Calming ePrimer](#).





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## Proven Safety Countermeasures



### Safety Benefits:

**15%**  
reduction in total crashes.<sup>1</sup>

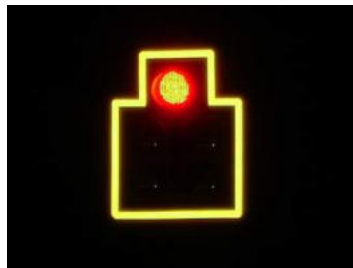
For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures/> and <https://rosap.ntl.bts.gov/view/dot/42807>.

FHWA-SA-21-039

### Backplates with Retroreflective Borders

Backplates added to a traffic signal head improve the visibility of the illuminated face of the signal by introducing a controlled-contrast background. The improved visibility of a signal head with a backplate is made even more conspicuous by framing it with a 1- to 3-inch yellow retroreflective border. Signal heads that have backplates equipped with retroreflective borders are more visible and conspicuous in both daytime and nighttime conditions.

This treatment is recognized as a human factors enhancement of traffic signal visibility, conspicuity, and orientation for both older and color vision deficient drivers. This countermeasure is also advantageous during periods of power outages when the signals would otherwise be dark, providing a visible cue for motorists to stop at the intersection ahead.



Retroreflective borders are highly visible during the night. Source: South Carolina DOT

#### Considerations

Transportation agencies should consider backplates with retroreflective borders as part of their efforts to systematically improve safety performance at signalized intersections. Adding a retroreflective border to an existing signal backplate is a very low-cost safety treatment. This can be done by either adding retroreflective tape to an existing backplate or purchasing a new backplate with a retroreflective border already incorporated. The most efficient means of implementing this proven

safety countermeasure is to adopt it as a standard treatment for signalized intersections across a jurisdiction or State.

Implementation challenges include minimizing installation time, accessing existing signal heads, and structural limitations due to added wind load in instances where an entire backplate is added. Agencies should consider the design of the existing signal support structure to determine if the design is sufficient to support the added wind load.



Signal backplate framed with a retroreflective border. Source: FHWA

<sup>1</sup> Sayed, T., Leur, P., and Pump, J., "Safety Impact of Increased Traffic Signal Backboards Conspicuity," 2005 TRB 84th Annual Meeting: Compendium of Papers CD-ROM, Vol. TRB#05-16, Washington, D.C., (2005).





### Safety Benefits:

Reducing driveway density

## 5-23%

reduction in total crashes along 2-lane rural roads.<sup>3</sup>

## 25-31%

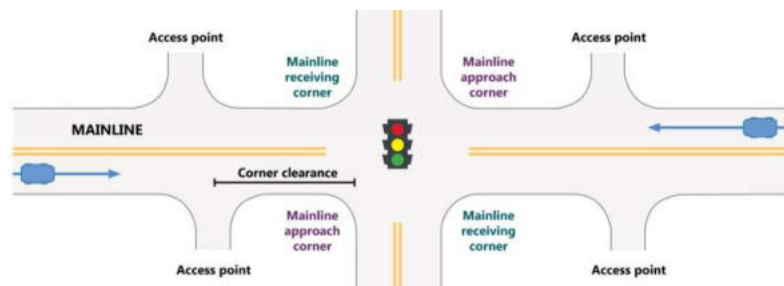
reduction in fatal and injury crashes along urban/suburban arterials.<sup>4</sup>

For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures/> and <https://safety.fhwa.dot.gov/intersection/cam/index.cfm>.

FHWA-SA-21-040

## Corridor Access Management

Access management refers to the design, application, and control of entry and exit points along a roadway. This includes intersections with other roads and driveways that serve adjacent properties. Thoughtful access management along a corridor can simultaneously enhance safety for all modes, facilitate walking and biking, and reduce trip delay and congestion.



Schematic of an intersection and adjacent access points. Source: FHWA

Every intersection, from a signalized intersection to an unpaved driveway, has the potential for conflicts between vehicles, pedestrians, and bicyclists. The number and types of conflict points—locations where the travel paths of two users intersect—influence the safety performance of the intersection or driveway. FHWA developed corridor-level crash prediction models to estimate and analyze the safety effects of selected access management techniques for different area types, land uses, roadway variables, and traffic volumes.<sup>1</sup>

The following access management strategies can be used individually or in combination with one another:

- Reduce density through driveway closure, consolidation, or relocation.
- Manage spacing of intersection and access points.
- Limit allowable movements at driveways (such as right-in/right-out only).

- Place driveways on an intersection approach corner rather than a receiving corner, which is expected to have fewer total crashes.<sup>2</sup>
- Implement raised medians that preclude across-roadway movements.
- Utilize designs such as roundabouts or reduced left-turn conflicts (such as restricted crossing U-turn, median U-turns, etc.).
- Provide turn lanes (i.e., left-only, right-only, or interior two-way left).
- Use lower speed one-way or two-way off-arterial circulation roads.

Successful corridor access management involves balancing overall safety and mobility for all users along with the needs of adjacent land uses.



Tandem roundabouts with a continuous raised median eliminates left-turn and across-roadway conflicts. Source: FHWA

<sup>1</sup> Gross et al. Safety Evaluation of Access Management Policies and Techniques. FHWA-HRT-14-057, (2018).  
<sup>2</sup> Le et al. Safety Evaluation of Corner Clearance at Signalized Intersections. FHWA-HRT-17-084, (2018).  
<sup>3</sup> Harwood et al. Prediction of the Expected Safety Performance of Rural Two-Lane Highways. FHWA-RD-99-207, (2000).  
<sup>4</sup> Elvik, R. and Vaa, T. Handbook of Road Safety Measures. Oxford, United Kingdom, Elsevier, (2004).





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# Proven Safety Countermeasures



### Safety Benefits:

**RCUT**  
**Two-Way**  
**Stop-Controlled to RCUT:**

**54%**

reduction in fatal and injury crashes.<sup>2</sup>

**Signalized Intersection**  
**to Signalized RCUT:**

**22%**

reduction in fatal and injury crashes.<sup>3</sup>

**Unsignalized Intersection**  
**to Unsignalized RCUT:**

**63%**

reduction in fatal and injury crashes.<sup>4</sup>

**MUT**

**30%**

reduction in intersection-related injury crash rate.<sup>5</sup>

For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures/> and <https://safety.fhwa.dot.gov/intersection/rltci/index.cfm>.

FHWA-SA-21-030

## Reduced Left-Turn Conflict Intersections

Reduced left-turn conflict intersections are geometric designs that alter how left-turn movements occur. These intersections simplify decision-making for drivers and minimize the potential for higher severity crash types, such as head-on and angle. Two highly effective designs that rely on U-turns to complete certain left-turn movements are known as the Restricted Crossing U-turn (RCUT) and the Median U-turn (MUT).

### Restricted Crossing U-turn

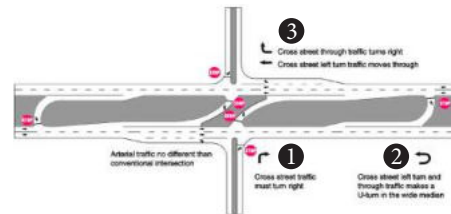
The RCUT intersection, also known as a J-Turn, Superstreet, or Reduced Conflict Intersection, modifies the direct left-turn and through movements from cross-street approaches. Minor road traffic makes a right turn followed by a U-turn at a designated location—either signalized or unsignalized—to continue in the desired direction. The RCUT is suitable for and adaptable to a wide variety of circumstances, ranging from isolated rural, high-speed locations to urban and suburban high-volume, multimodal corridors. It is a competitive and less costly alternative to constructing an interchange. RCUTs work well when consistently used along a corridor, but also can be used effectively at individual intersections. Studies have shown that installing an RCUT can result in a 30-percent increase in throughput and a 40-percent reduction in network intersection travel time.<sup>1</sup>

### Median U-turn

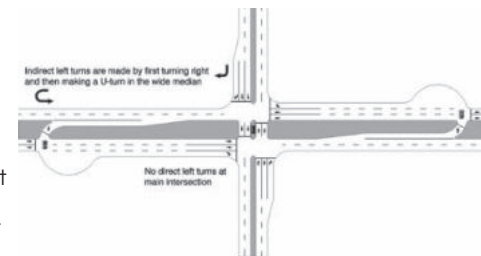
The MUT intersection modifies direct left turns from the major approaches. Vehicles proceed through the main intersection, make a U-turn a short distance downstream, followed by a right turn at the main intersection. The U-turns can also be used for

modifying the cross-street left turns, similar to the RCUT.

The MUT is an excellent choice for intersections with heavy through traffic and moderate left-turn volumes. Studies have shown a 20- to 50-percent improvement in intersection throughput for various lane configurations as a result of implementing the MUT design. When implemented at multiple intersections along a corridor, the efficient two-phase signal operation of the MUT can reduce delay, improve travel times, and create more crossing opportunities for pedestrians and bicyclists.



Example of a signalized RCUT intersection. Source: FHWA



Example of a MUT intersection. Source: FHWA

### Michigan Left

**30 - 60% reduction in total, 60 - 90% reduction in rear-end and head-on left-turn, and 60% reduction in angle crashes**

1 Hughes and Jagannathan. Restricted Crossing U-Turn Intersection. FHWA-HRT-09-059, (2009).  
2 Edara et al. Evaluation of J-Turn Intersection Design Performance in Missouri. MoDOT, (2013).  
3 Hummer and Rao. Safety Evaluation of a Signalized Restricted Crossing U-Turn. FHWA-HRT-17-082, (2017).  
4 Hummer et al. Superstreet Benefits and Capacities. FHWA/NC/2009-06, NC State University, (2010).  
5 Synthesis of the Median U-Turn Treatment, Safety, and Operational Benefits. FHWA-HRT-07-033, (2007).





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# Proven Safety Countermeasures



## Safety Benefits:

**36-50%**  
reduction in  
red light running.<sup>2</sup>

**8-14%**  
reduction in  
total crashes.<sup>2</sup>

**12%**  
reduction in  
injury crashes.<sup>2</sup>

For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures/> and <https://safety.fhwa.dot.gov/intersection/signal/fhwas13027.pdf>.

FHWA-SA-21-043

## Yellow Change Intervals

At a signalized intersection, the yellow change interval is the length of time that the yellow signal indication is displayed following a green signal indication. The yellow signal confirms to motorists that the green has ended and that a red will soon follow.

Since red-light running is a leading cause of severe crashes at signalized intersections, it is imperative that the yellow change interval be appropriately timed. Too brief an interval may result in drivers being unable to stop safely and cause unintentional red-light running. Too long of an interval may result in drivers treating the yellow as an extension of the green phase and invite intentional red-light running. Factors such as the speed of approaching and turning vehicles, driver perception-reaction time, vehicle deceleration, and intersection geometry should all be considered in the timing calculation.

Transportation agencies can improve signalized intersection safety and reduce red-light running by reviewing and updating their traffic signal timing policies and procedures concerning the yellow change interval. Agencies should institute regular evaluation and adjustment protocols for existing traffic signal timing. Refer to the *Manual on Uniform Traffic Control Devices* for basic requirements and further recommendations about yellow change interval timing. As part of strategic signal system modernization and updates, incorporating automated traffic signal performance measures (ATSPMs) is a proven approach to improve on traditional retiming processes. ATSPMs provide continuous performance monitoring capability and the ability to modify timing based on actual performance, without requiring expensive modeling or data collection.<sup>1</sup>



Appropriately timed yellow change intervals can reduce red-light running and improve overall intersection safety. Source: FHWA

<sup>1</sup> Federal Highway Administration. "Automated Traffic Signal Performance." (2020).  
<sup>2</sup> NCHRP Report 731: Guidelines for Timing Yellow and All-Red Intervals at Signalized Intersections. (2011).







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# Proven Safety Countermeasures



**Safety Benefits:**  
**High-visibility crosswalks can reduce pedestrian injury crashes up to:**

**40%<sup>1</sup>**

**Intersection lighting can reduce pedestrian crashes up to:**

**42%<sup>2</sup>**

**Advance yield or stop markings and signs can reduce pedestrian crashes up to:**

**25%<sup>3</sup>**

**For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures/> and [https://safety.fhwa.dot.gov/ped\\_bike/step/docs/tech\\_sheet\\_VizEnhancem2018.pdf](https://safety.fhwa.dot.gov/ped_bike/step/docs/tech_sheet_VizEnhancem2018.pdf).**

FHWA-SA-21-049

## Crosswalk Visibility Enhancements

Poor lighting conditions, obstructions such as parked cars, and horizontal or vertical roadway curvature can reduce visibility at crosswalks, contributing to safety issues. For multilane roadway crossings where vehicle volumes are in excess of 10,000 Average Annual Daily Traffic (AADT), a marked crosswalk alone is typically not sufficient. Under such conditions, more substantial crossing improvements could prevent an increase in pedestrian crash potential.

Three main crosswalk visibility enhancements help make crosswalks and the pedestrians, bicyclists, wheelchair and other mobility device users, and transit users using them more visible to drivers. These include high-visibility crosswalks, lighting, and signing and pavement markings. These enhancements can also assist users in deciding where to cross. Agencies can implement these features as standalone or combination enhancements to indicate the preferred location for users to cross.

### High-visibility crosswalks

High-visibility crosswalks use patterns (i.e., bar pairs, continental, ladder) that are visible to both the driver and pedestrian from farther away compared to traditional transverse line crosswalks. They should be considered at all midblock pedestrian crossings and uncontrolled intersections. Agencies should use materials such as inlay or thermoplastic tape, instead of paint or brick, for highly reflective crosswalk markings.

### Improved Lighting

The goal of crosswalk lighting should be to illuminate with positive contrast to make it easier for a driver to visually identify the pedestrian. This involves carefully placing the luminaires in forward locations to avoid a silhouette effect of the pedestrian.

### Enhanced Signing and Pavement Markings

On multilane roadways, agencies can use "YIELD Here to Pedestrians" or "STOP Here for Pedestrians" signs 20 to 50 feet in advance of

a marked crosswalk to indicate where a driver should stop or yield to pedestrians, depending on State law. To supplement the signing, agencies can also install a STOP or YIELD bar (commonly referred to as "shark's teeth") pavement markings.

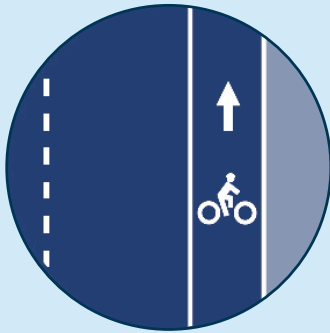
In-street signing, such as "STOP Here for Pedestrians" or "YIELD Here to Pedestrians" may be appropriate on roads with two- or three-lane roads where speed limits are 30 miles per hour or less.



Source: FHWA

1 Chen, L., C. Chen, and R. Ewing. The Relative Effectiveness of Pedestrian Safety Countermeasures at Urban Intersections - Lessons from a New York City Experience. (2012).  
2 Elvik, R. and Vaa, T. Handbook of Road Safety Measures. Oxford, United Kingdom, Elsevier, (2004).  
3 Zeeger et al. Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments, FHWA, (2017).





**Safety Benefits:**  
Bicycle Lane Additions can reduce crashes up to:

**57%**

for total crashes on urban 4-lane undivided collectors and local roads.<sup>6</sup>

**30%**

for total crashes on urban 2-lane undivided collectors and local roads.<sup>6</sup>



Separated bicycle lane in Washington, DC.  
Source: Alex Baca, Washington Area Bicyclist Association

Separated bicycle lanes may provide further safety benefits. FHWA is anticipating completion of research in Fall 2022.

**For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures/> and [https://safety.fhwa.dot.gov/ped\\_bike/tools\\_solve/docs/fhwas18077.pdf](https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwas18077.pdf).**

FHWA-SA-21-051

## Bicycle Lanes

Most fatal and serious injury bicyclist crashes occur at non-intersection locations. Nearly one-third of these crashes involve overtaking motorists<sup>1</sup>; the speed and size differential between vehicles and bicycles can lead to severe injury. To make bicycling safer and more comfortable for most types of bicyclists, State and local agencies should consider installing bicycle lanes. These dedicated facilities for the use of bicyclists along the roadway can take several forms. Providing bicycle facilities can mitigate or prevent interactions, conflicts, and crashes between bicyclists and motor vehicles, and create a network of safer roadways for bicycling. Bicycle Lanes align with the Safe System Approach principle of recognizing human vulnerability—where separating users in space can enhance safety for all road users.

### Applications

FHWA's [Bikeway Selection Guide](#) and [Incorporating On-Road Bicycle Networks into Resurfacing Projects](#) assist agencies in determining which facilities provide the most benefit in various contexts. Bicycle lanes can be included on new roadways or created on existing roads by reallocating space in the right-of-way.

In addition to the paint stripe used for a typical bicycle lane, a lateral offset with painted buffer can help to further separate bicyclists from vehicle traffic. State and local agencies may also consider physical separation of the bicycle lane from motorized traffic lanes through the use of vertical elements like posts, curbs, or vegetation.<sup>2</sup> Based on international experience and implementation in the United States, there is potential for further safety benefits associated with separated bicycle lanes. FHWA is conducting research on separated bicycle lanes, which includes the development of crash modification factors, to be completed in 2022 to address significant interest on this topic.

### Considerations

- City and State policies may require minimum bicycle lane widths, although these can differ by agency and functional classification of the road.
- Bicycle lane design should vary according to roadway characteristics (e.g., motor vehicle volumes and speed) in order to maximize the facility's suitability for riders of all ages and abilities and should consider the travel needs of low-income populations likely to use bicycles. The [Bikeway Selection Guide](#) is a useful resource.
- While some in the public may oppose travel lane narrowing if they believe it will slow traffic or increase congestion, studies have found that roadways did not experience an increase in injuries or congestion when travel lane widths were decreased to add a bicycle lane.<sup>3</sup>
- Studies and experience in US cities show that bicycle lanes increase ridership and may help jurisdictions better manage roadway capacity without increased risk.
- In rural areas, rumble strips can negatively impact bicyclists' ability to ride if not properly installed. Agencies should consider the dimensions, placement, and offset of rumble strips when adding a bicycle lane.<sup>4</sup>
- Strategies, practices, and processes can be used by agencies to enhance their ability to address equity in bicycle planning and design.<sup>5</sup>

<sup>1</sup> Thomas et al. Bicyclist Crash Types on National, State, and Local Levels: A New Look. Transportation Research Record 673(6), 664-676, (2019).

<sup>2</sup> [Separated Bike Lane Planning and Design Guide](#). FHWA-HEP-15-025, (2015).

<sup>3</sup> Park and Abdel-Aty. "Evaluation of safety effectiveness of multiple cross sectional features on urban arterials". Accident Analysis and Prevention, Vol. 92, pp. 245-255, (2016).

<sup>4</sup> FHWA Tech Advisory [Shoulder and Edge Line Rumble Strips](#), (2011).

<sup>5</sup> Sandt et al. [Pursuing Equity in Pedestrian and Bicycle Planning](#). FHWA, (2016).

<sup>6</sup> Avelar et al. Development of Crash Modification Factors for Bicycle Lane Additions While Reducing Lane and Shoulder Widths. FHWA, (2021).





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## Proven Safety Countermeasures



### Safety Benefits:

RRFBs can reduce crashes up to:

**47%**

for pedestrian crashes.<sup>4</sup>

RRFBs can increase motorist yielding rates up to:

**98%**

(varies by speed limit, number of lanes, crossing distance, and time of day).<sup>3</sup>



RRFBs used at a trail crossing.  
Source: LJB

For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures/> and [https://safety.fhwa.dot.gov/ped\\_bike/step/docs/techSheet\\_RRFB\\_2018.pdf](https://safety.fhwa.dot.gov/ped_bike/step/docs/techSheet_RRFB_2018.pdf).

FHWA-SA-21-053

## Rectangular Rapid Flashing Beacons (RRFB)

A marked crosswalk or pedestrian warning sign can improve safety for pedestrians crossing the road, but at times may not be sufficient for drivers to visibly locate crossing locations and yield to pedestrians. To enhance pedestrian conspicuity and increase driver awareness at uncontrolled, marked crosswalks, transportation agencies can install a pedestrian actuated Rectangular Rapid Flashing Beacon (RRFB) to accompany a pedestrian warning sign. RRFBs consist of two, rectangular-shaped yellow indications, each with a light-emitting diode (LED)-array-based light source.<sup>1</sup> RRFBs flash with an alternating high frequency when activated to enhance conspicuity of pedestrians at the crossing to drivers.

For more information on using RRFBs, see the Interim Approval in the *Manual on Uniform Traffic Control Devices (MUTCD)*.<sup>1</sup>

### Applications

The RRFB is applicable to many types of pedestrian crossings but is particularly effective at multilane crossings with speed limits less than 40 miles per hour.<sup>2</sup> Research suggests RRFBs can result in motorist yielding rates as high as 98 percent at marked crosswalks, but varies depending on the location, posted speed limit, pedestrian crossing distance, one- versus two-way road, and the number of travel lanes.<sup>3</sup> RRFBs can also accompany school or trail crossing warning signs.

RRFBs are placed on both sides of a crosswalk below the pedestrian crossing sign and above the diagonal downward arrow plaque pointing at the crossing.<sup>1</sup> The flashing pattern can be activated with pushbuttons or passive (e.g., video or infrared) pedestrian detection, and should be unlit when not activated.

### Considerations

#### Agencies should:<sup>2</sup>

- Install RRFBs in the median rather than the far-side of the roadway if there is a pedestrian refuge or other type of median.
- Use solar-power panels to eliminate the need for a power source.
- Reserve the use of RRFBs for locations with significant pedestrian safety issues, as over-use of RRFB treatments may diminish their effectiveness.

#### Agencies shall not:<sup>2</sup>

- Use RRFBs without the presence of a pedestrian, school or trail crossing warning sign.
- Use RRFBs for crosswalks across approaches controlled by YIELD signs, STOP signs, traffic control signals, or pedestrian hybrid beacons, except for the approach or egress from a roundabout.

<sup>1</sup> *MUTCD Interim Approval 21 - RRFBs at Crosswalks*.

<sup>2</sup> "Rectangular Rapid Flash Beacon" in PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System. FHWA, (2013).

<sup>3</sup> Fitzpatrick et al. "Will You Stop for Me? Roadway Design and Traffic Control Device Influences on Drivers Yielding to Pedestrians in a Crosswalk with a Rectangular Rapid-Flashing Beacon." Report No. TTI-CTS-0010. Texas A&M Transportation Institute, (2016).

<sup>4</sup> NCHRP Research Report 841 Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments, (2017).





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# Proven Safety Countermeasures



## Safety Benefits:

# 13%

reduction in pedestrian-vehicle crashes at intersections.<sup>1</sup>

## Leading Pedestrian Interval

A leading pedestrian interval (LPI) gives pedestrians the opportunity to enter the crosswalk at an intersection 3-7 seconds before vehicles are given a green indication. Pedestrians can better establish their presence in the crosswalk before vehicles have priority to turn right or left.

### LPIs provide the following benefits:

- Increased visibility of crossing pedestrians.
- Reduced conflicts between pedestrians and vehicles.
- Increased likelihood of motorists yielding to pedestrians.
- Enhanced safety for pedestrians who may be slower to start into the intersection.

FHWA's Handbook for *Designing Roadways for the Aging Population* recommends the use of the LPI at intersections with high turning vehicle volumes. Transportation agencies should refer to the *Manual on Uniform Traffic Control Devices* for guidance on LPI timing and ensure that pedestrian signals are accessible for all users. Costs for implementing LPIs are very low when only signal timing alteration is required.



An LPI allows a pedestrian to establish a presence in the crosswalk before vehicles are given a green indication. Source: FHWA



LPIs reduce potential conflicts between pedestrians and turning vehicles. Source: FHWA

For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures/> and [https://safety.fhwa.dot.gov/ped\\_bike/step/resources/docs/fhwas19040.pdf](https://safety.fhwa.dot.gov/ped_bike/step/resources/docs/fhwas19040.pdf).

FHWA-SA-21-032

<sup>1</sup> Goughnour, E., D. Carter, C. Lyon, B. Persaud, B. Lan, P. Chun, I. Hamilton, and K. Signor. "Safety Evaluation of Protected Left-Turn Phasing and Leading Pedestrian Intervals on Pedestrian Safety." Report No. FHWA-HRT-18-044. Federal Highway Administration. (October 2018)





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## Proven Safety Countermeasures



### Safety Benefits:

Median with  
Marked Crosswalk

**46%**

reduction in  
pedestrian crashes.<sup>2</sup>

Pedestrian Refuge  
Island

**56%**

reduction in  
pedestrian crashes.<sup>2</sup>

For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures/> and [https://safety.fhwa.dot.gov/ped\\_bike/step/docs/techSheet\\_PedRefugelsand2018.pdf](https://safety.fhwa.dot.gov/ped_bike/step/docs/techSheet_PedRefugelsand2018.pdf).

FHWA-SA-21-044

## Medians and Pedestrian Refuge Islands in Urban and Suburban Areas

A **median** is the area between opposing lanes of traffic, excluding turn lanes. Medians in urban and suburban areas can be defined by pavement markings, raised medians, or islands to separate motorized and non-motorized road users.

A **pedestrian refuge island** (or crossing area) is a median with a refuge area that is intended to help protect pedestrians who are crossing a road.

Pedestrian crashes account for approximately 17 percent of all traffic fatalities annually, and 74 percent of these occur at non-intersection locations.<sup>1</sup> For pedestrians to safely cross a roadway, they must estimate vehicle speeds, determine acceptable gaps in traffic based on their walking speed, and predict vehicle paths. Installing a median or pedestrian refuge island can help improve safety by allowing pedestrians to cross one direction of traffic at a time.

Transportation agencies should consider medians or pedestrian refuge islands in curbed sections of urban and suburban multilane

roadways, particularly in areas with a significant mix of pedestrian and vehicle traffic, traffic volumes over 9,000 vehicles per day, and travel speeds 35 mph or greater. Medians/refuge islands should be at least 4-ft wide, but preferably 8 ft for pedestrian comfort. Some example locations that may benefit from medians or pedestrian refuge islands include:

- Mid-block crossings.
- Approaches to multilane intersections.
- Areas near transit stops or other pedestrian-focused sites.



Example of a road with a median and pedestrian refuge islands. Source: City of Charlotte, NC



Median and pedestrian refuge island near a roundabout. Source: [www.pedbikeimages.org](http://www.pedbikeimages.org) / Dan Burden

<sup>1</sup> National Center for Statistics and Analysis. (2020, March). Pedestrians: 2018 data (Traffic Safety Facts, Report No. DOT HS 812 850). National Highway Traffic Safety Administration

<sup>2</sup> Desktop Reference for Crash Reduction Factors, FHWA-SA-08-011, September 2008, Table 11.





U.S. Department of Transportation  
Federal Highway Administration

OFFICE OF SAFETY

# Proven Safety Countermeasures



## Safety Benefits:

**55%**  
reduction in  
pedestrian crashes.<sup>2</sup>

**29%**  
reduction in total crashes.<sup>3</sup>

**15%**  
reduction in fatal and  
serious injury crashes.<sup>3</sup>



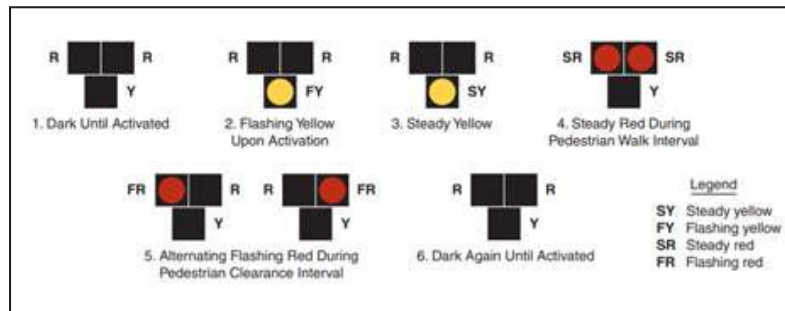
Example of PHBs mounted on a mast arm. Source: FHWA

For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures/> and [https://safety.fhwa.dot.gov/ped\\_bike/step/resources/docs/fhwas18064.pdf](https://safety.fhwa.dot.gov/ped_bike/step/resources/docs/fhwas18064.pdf).

FHWA-SA-21-045

## Pedestrian Hybrid Beacons

The pedestrian hybrid beacon (PHB) is a traffic control device designed to help pedestrians safely cross higher-speed roadways at midblock crossings and uncontrolled intersections. The beacon head consists of two red lenses above a single yellow lens. The lenses remain "dark" until a pedestrian desiring to cross the street pushes the call button to activate the beacon, which then initiates a yellow to red lighting sequence consisting of flashing and steady lights that directs motorists to slow and come to a stop, and provides the right-of-way to the pedestrian to safely cross the roadway before going dark again.



Sequence for a PHB. Source: MUTCD 2009 Edition, p. 511, FHWA

Nearly 74 percent of pedestrian fatalities occur at non-intersection locations, and vehicle speeds are often a major contributing factor.<sup>1</sup> As a safety strategy to address this pedestrian crash risk, the PHB is an intermediate option between a flashing beacon and a full pedestrian signal because it assigns right of way and provides positive stop control. It also allows motorists to proceed once the pedestrian has cleared their side of the travel lane(s), reducing vehicle delay.

Transportation agencies should refer to the *Manual on Uniform Traffic Control Devices* (MUTCD) for information on the application of PHBs.

In general, PHBs are used where it is difficult for pedestrians to cross a roadway, such as when gaps in traffic are not sufficient or speed limits exceed 35 miles per hour. They are very effective at locations where three or more lanes will be crossed or traffic volumes are above 9,000 annual average daily traffic. Installation of a PHB must also include a marked crosswalk and pedestrian countdown signal. If PHBs are not already familiar to a community, agencies should conduct appropriate education and outreach as part of implementation.

<sup>1</sup> National Center for Statistics and Analysis. (2020, March). Pedestrians: 2018 data (Traffic Safety Facts, Report No. DOT HS 812 850). National Highway Traffic Safety Administration

<sup>2</sup> Zegeer et al. NCHRP Report 841: Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments. TRB, (2017).

<sup>3</sup> Fitzpatrick, K. and Park, E.S. Safety Effectiveness of the HAWK Pedestrian Crossing Treatment. FHWA-HRT-10-042. (2010).





**Safety Benefits:**  
**Lighting can reduce crashes up to:**

**42%**

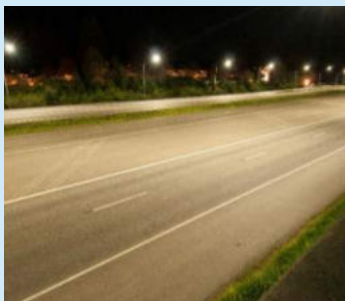
for nighttime injury pedestrian crashes at intersections.<sup>1</sup>

**33-38%**

for nighttime crashes at rural and urban intersections.<sup>1</sup>

**28%**

for nighttime injury crashes on rural and urban highways.<sup>1</sup>



Source: WSDOT

**For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures/> and [https://safety.fhwa.dot.gov/roadway\\_dept/night\\_visib/roadwayresources.cfm](https://safety.fhwa.dot.gov/roadway_dept/night_visib/roadwayresources.cfm).**

FHWA-SA-21-050

**Lighting**

The number of fatal crashes occurring in daylight is about the same as those that occur in darkness. However, the nighttime fatality rate is three times the daytime rate because only 25 percent of vehicle miles traveled (VMT) occur at night. At nighttime, vehicles traveling at higher speeds may not have the ability to stop once a hazard or change in the road ahead becomes visible by the headlights. Therefore, lighting can be applied continuously along segments and at spot locations such as intersections and pedestrian crossings in order to reduce the chances of a crash.

Adequate lighting (i.e., at or above minimum acceptable standards) is based on research recommending horizontal and vertical illuminance levels to provide safety benefits to all users of the roadway environment. Adequate lighting can also provide benefits in terms of personal security for pedestrians, wheelchair and other mobility device users, bicyclists, and transit users as they travel along and across roadways.

**Applications**

**Roadway Segments**

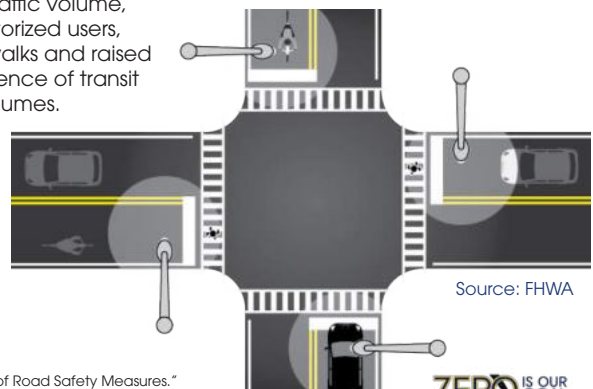
Research indicates that continuous lighting on both rural and urban highways (including freeways) has an established safety benefit for motorized vehicles.<sup>1</sup> Agencies can provide adequate visibility of the roadway and its users through the uniform application of lighting that provides full coverage along the roadway and the strategic placement of lighting where it is needed the most.

**Intersections and Pedestrian Crossings**

Increased visibility at intersections at nighttime is important since various modes of travel cross paths at these locations. Agencies should consider providing lighting to intersections based on factors such as a history of crashes at nighttime, traffic volume, the volume of non-motorized users, the presence of crosswalks and raised medians, and the presence of transit stops and boarding volumes.

**Considerations**

Most new lighting installations are made with breakaway features, shielded, or placed far enough from the roadway to reduce the probability and/or severity of fixed-object crashes. Modern lighting technology gives precise control with minimal excessive light affecting the nighttime sky or spilling over to adjacent properties. Agencies can equitably engage with underserved communities to determine where and how new and improved lighting can most benefit the community by considering their priorities, including eliminating crash disparities, connecting to essential neighborhood services, improving active transportation routes, and promoting personal safety.



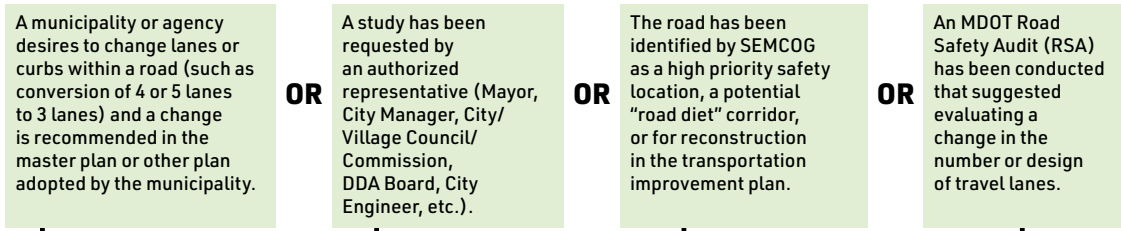
Source: FHWA

<sup>1</sup> Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004).



## MDOT Complete Streets Process Guide for Southeast Michigan

### What Objective is the Project Attempting to Accomplish?



Is the road segment under consideration an **MDOT trunkline** or does it intersect with an MDOT trunkline?

**NO** **YES**

Does the road meet **all three of the following criteria**?

1. The municipality or agency has an adopted complete streets policy, resolution, or ordinance
2. The desired design will result in average daily traffic volumes of 9,000 vehicles per lane or less (e.g. 18,000 daily to go from 4 or 5 lanes to 3) in an urban context, 6,500 in suburban, and 6,000 for rural
3. The road is not on the National Highway System as a Major Truck Route

**Use Multimodal Tool and conduct study.** You may contact SEMCOG for available data, any safety studies, or advice.

**Contact MDOT Regional Planner and TSC Manager** to discuss situation, goals, and desired outcomes; performance measures; potential alternatives; and study methodology (i.e. scoping meeting); and agree on city or MDOT funding for study, implementation, and maintenance. The advocate must also inform MDOT of who is an "authorized agent" to approve a change (e.g. elected body, manager, staff).

**MDOT Regional Engineer** determines whether standard **MDOT Road Diet Checklist** applies.

If **study outcome** recommends reallocation of space within the ROW (and, if applicable, MDOT and municipality agree on funding for design, construction and maintenance based on the type of project), there are three types of projects:

### Project Classification

### Project Requirements for MDOT Trunklines

*These requirements may be used as guidelines for local and county roads but are not required.*

**1. Temporary test**  
A trial period to evaluate outcomes

Agreement with MDOT must be achieved on:

- Duration of test period, design, materials, signs, etc.
- Public awareness of trial project
- Collection of data before and during the pilot period to evaluate outcome (multimodal counts, traffic speeds, etc.)

If outcome satisfies expectations, then proceed to category 2 or 3.

**2. Low-cost options**  
No change to curbs

- Municipality's authorized agent endorses the change
- Change has been approved by MDOT
- MDOT may require agreement on restoration of prior design under certain outcomes

**3. Street reconstruction**  
Bumpouts, change to curbs, etc.

- Public meeting has been conducted and comments documented
- Municipality's authorized agent endorses the change

**Implement complete streets project** → **Conduct follow-up studies on performance measures**