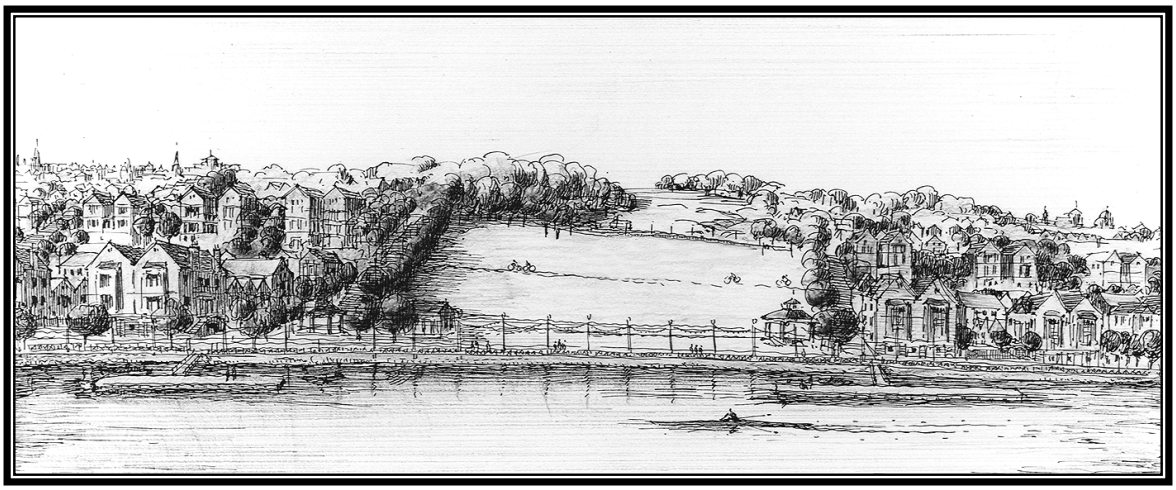
B E E R L I N E

"B"

MASTER PLAN & NEIGHBORHOOD CODE



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PREPARED FOR

Redevelopment Authority of the City of Milwaukee

May 1999

Chapter 1 • Preliminaries

1.2 Acknowledgements

Support for this planning effort came from many sources. Our process included three public meetings and numerous meetings with interested individuals and constituent groups. We wish to acknowledge the following city officials, stakeholders, individuals, and groups for their contributions.

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Community Stakeholders

The following individuals who represented themselves, local neighborhoods, and local businesses were generous in their participation and support by attending the public meetings as well as meeting with the planning team members.

Gary & Patty Ahrens *Milwaukee Rowing Club*
Frank Alioto *Brady St. Association*
David Berkley *Martin Luther King EDC*
Eva Berry *Daily Reporter*
Steve Bialk *Brewer's Hill*
Jay Blankenship *Children's Outing Asso.*
Brigette Breitenbach *Riverwalk District*
Dennis Burgener *Resident*
Tim Burns
Ellen Callahan *Brady St BID*
Mike Carnahan
Walt Chowanec *Melanec's Restaurant*
Jeff Clausen *Business Owner*
Bob Crawford *MPS Teacher*
Fletcher Crawford *Halyard Park Asso.*
Jeff & Catherine Crawford
Dorothy Dean *County Supervisor*
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Tim Dixon *Resident*
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Mary Dzeiwiontriski *Brewer's Hill*
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George J. Edward
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Bill Farmer *MMSD*
Shirley Ferguson *East Village Asso/Brady St Asso.*
Janet Fitch *Neighbor*
Mark Franke *Brewer's Hill*
Claude Gagnon *Resident*
Denise Gaumer *Hunter Group*
Sharon Gayan *DNR*
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Mike Kaufmann *Homeowner*
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Julilly Kohler *Brady Street Asso.*
Kate Kolitz *Brewer's Hill Asso.*
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Mr. & Mrs. Earl Lazenby *Homeowners*
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Mike Loughran *DPW*
Mike Lowrey *Neighborhood*
Shel Lozoff *Realtor*
Chris Magruder *MMSD*
Tonya Mantilla *ESHAC*
Henry Manzer *Homeowner*
Tom Mellencamp *RACM*
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Jim Moran
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Ken Nelson *Milwaukee Rowing Club*
William Nolen *Brewer's Hill*
Dave Novak *DPW*
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Matt Plusnick
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Yoshiko Rongholt *Homeowner*
Donna Rongholt-Niegan *Homeowner*
Randy Roth *King Drive BID*
Dave Rotter *National Ace Hardware*
Max Samson *Children's Outing Asso.*
Ray Schaefer
Bill Scherbarth *East Village Asso.*
Donna Schlieman
Wat Schumann
Mike & Julie Scott
Maron Sherwood *Brewer's Hill*
Donna & Pete Siegworth *Brewer's Hill Asso.*
Gerald Skalmusky *Homeowner*
Shaun Smart *Homeowner*
J.W. & Faith Spear *CH2MHill*
Moreen Spear
Deana Swetlik
Jay Allen Stokes *ICRC*
Cathy Thomas *East Village/Brady Street*
Lynn Torgerson *DNR*
Charlie Trainer *TMB Development*
Debra Usinger
R. Waswo *Resident*
Will Wawrzyn *DNR*
Michael Weber *Brewer's Hill*
Jenny Weiss *Riverwalk District*
V. Wilson *Brewer's Hill*
Claude Yates
Patty Yurich *Homeowner*
Tom Zabjek

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Chapter 2 • Introduction

2.1 Goals and Objectives

The Beer Line "B" project has evolved from a series of investigations exploring the revitalization of the area between Pleasant Street and Humboldt Avenue along the Milwaukee River. Formerly an industrial and commercial zone along the river, it has for many years been grossly under utilized. Because of its strategic location in the middle of vibrant urban neighborhoods, the City of Milwaukee Department of City Development has undertaken several studies using its own staff in conjunction with a variety of consultants to examine the nature and possibilities of this unique urban area.

This study is in response to the City's request to examine residential and neighborhood commercial development as a new use for this land. Although under multiple ownership, the vision for this underutilized land is a unified development for new urban housing with commercial and recreational components. This vision capitalizes on the natural amenities of the river, the former Beer Line "B" rail right-of-way, and the views to the downtown afforded by the steep bluffs.

Major goals for the project are as follows:

- Design a unified pedestrian friendly master plan which uses the amenities of river frontage, flat land, existing infrastructure, and the steep terrain to integrate this new development area into the downtown, the adjacent neighborhoods, and the Riverwalk system.
- Develop a market-responsive plan which provides a diversity of building types with the emphasis on owner-occupied housing.
- Connect the Brewer's Hill neighborhood with the new area below by extending elements of the upper street grid to the river.
- Examine the potential of Kilbourn Park and its relationship to the development areas adjacent to the river and the Riverwalk system.
- Provide additional information regarding the suitability for development and disposition of multiple parcels vis-à-vis existing buildings, infrastructure and environmental condition.
- Use the area's topography and natural amenities to develop unique public places and housing typologies.
- Involve stakeholders and adjacent neighborhood residents in identifying issues and building consensus and support for the final development plan.

In the context of the above-stated goals, the design team has worked with the Department of City Development to develop the following project objectives:

- Produce a final document which will be useable by the City as a basis for writing discrete "Requests for Proposals" from developers.
- Develop the final document as a "code" for decision-making regarding zoning issues, acceptable densities, building typologies, landscape amenities, open space strategies, and integration with the expanded infrastructure.
- Provide within the "code", design and density guidelines which provide a strong framework, yet allow developers creative flexibility to propose alternative options for given pieces of property.
- Design an overall plan in which the development interests of existing landowners are accommodated.
- Improve overall traffic patterns and ease of access to and through the site taking into account "traffic calming" measures suitable to a residential area.
- Increase the public's access to the river at several points within the development area, carefully differentiating public areas from private.

2.2 Process of Neighborhood Involvement

The design team involved the neighborhood as follows:

- Publicized the fact that the design process for the Beer Line "B" area is seeking to involve interested groups and individuals.
- Invited stakeholders (i.e., major land owners, representatives of neighborhood groups, members of the business community, agency representatives, etc.) to participate in workshops.

- Held six public meetings to discuss:
  - Goals, objectives, and issues.
  - Options for the development plan and its components.
  - A final draft development plan which incorporates the specific concerns of groups and individuals.

The preliminary development plan has been described throughout this process as a conceptual plan which emphasized choice and flexibility.

These public meetings were established to make public the sequential evolution of the planning process and to demonstrate at each level of refinement that public input was being heard and incorporated as a major resource throughout the entire initiative.

Outside the public meetings, the design team had numerous interviews with constituent groups and individuals to discuss in detail the ways in which proposals could affect their respective interests.

In addition, the team produced articles for various neighborhood and business association newsletters and a newsletter named the "Beer Line Buzz" to inform neighbors and stakeholders of the progress. This process was extremely helpful in defining the final master plan, particularly with respect to the use of the waterfront, the character of the housing, the relationship to the park, and finally, to the stakeholder interests on specific land parcels.

2.3 History of Site

The Beer Line "B" site along the west bank of the Milwaukee River, between Pleasant Street to the south, Humboldt Avenue to the northeast and Kilbourn Park and Reservoir Boulevard to the northwest, was developed in the early nineteenth century as part of Milwaukee's prospering industrial revolution. The rivers and lake were the dominant geographic features of the area and greatly aided in the transformation of Milwaukee from an early fur trading post to a major economic and industrial center. The Milwaukee River became navigable by large vessels only after a new harbor entrance from Lake Michigan was completed in 1857, allowing ships upstream and creating opportunities for development as far as the northern portions of what is today the Beer Line "B" site.

Byron Kilbourn, a surveyor, financier and ambitious land developer, was eager to develop other transportation links with local waterways, cities and ultimately the Mississippi River in 1836, so he obtained a land grant and charter to build the Rock River canal. Actual construction of the canal began in 1839, along with a dam across the Milwaukee River just south of North Avenue that helped to divert and harness the power of the flowing water for industry. Unfortunately for Kilbourn, the popularity of another form of transportation, the railway, proved too much for the success and completion of the canal and the project was abandoned with only one mile of canal constructed. The portion of the canal that was built paralleled the west bank of the River and provided a source of water power for the grist mills, flour mills, tanneries, foundries and factories which sprang up between the River and the canal. In 1884, after years of neglect, the obsolete canal was filled in and paved over to become Commerce Street. By the early 1900's, the influence of the Milwaukee River on industry and transportation had almost been totally usurped by the popularity of steam driven power and the railroad.

By the 1850's, the influence of the river on the growth of commerce and industry was in great decline. In 1854, the La Crosse and Milwaukee Railroad built a rail line along the west bank of the canal, traversing the natural bluff. This rail line serviced the factories, mills, tanneries and coal yards before climbing the grades of the bluff to the Humboldt Yards and roundhouse north of the Beer Line "B" site and immediately east of Humboldt Avenue. As with the canal, the necessity of the railroad as the major mode of transportation for the site diminished to the point of extinction in the 1920's. The tracks were removed due to the decline in rail activity along the corridor by the advent of new highway systems. At this point in history, industry was no longer tied to the river for its source of power and transportation, and the factories, mills, and foundries moved elsewhere where land was plentiful and access more convenient.

In November of 1959, the last boat delivery of coal to the site of the former Humboldt Avenue detention tank was off-loaded marking the end of the importance of the Beer Line "B" site to the industrial growth of Milwaukee. Most of the buildings that had been dedicated to this growth and progress, just decades earlier, were razed. The remaining buildings on the site have been adequately reused. The former Gimbel's

warehouse is converted into apartments and the City's Forestry building has been renovated into a microbrewery. Today, just a small amount of development activity continues while most of the site remains fallow.

Sources for this portion of the report include:

- "Phase I Environmental Site Assessment of the Beer Line "B" Project Site Milwaukee, Wisconsin"
- "Beer Line "B" Redevelopment Study", by HNTB, October 21, 1991
- "RFP, Beer Line "B" Redevelopment Area Master Plan and Neighborhood Code
- The Best of All Worlds; Milwaukee, Ruth Fromstein, Copyright 1990

Chapter 3 • Site Analysis

3.1 Milwaukee Density Study

An urban neighborhood is one that fosters the communal and community rather than isolation and privatization. A proper density with a range of public activities tightly integrated into the residential fabric will help support this idea of communal interaction and a public life prevalent in so many vibrant, urban neighborhoods. One way of supporting this interaction is to provide walkable streets. In an urban setting, it is the close proximity of amenities to housing, businesses and one another which creates destinations, opportunities for interaction, and the reason to walk.

The proximity of land uses to one another as created by dense environments also helps foster a sense of security. It is a comfort to know that neighbors, who have the same stake in the well being of the neighborhood are watching out for each other.

Density is important to urban development. Too much of it, and the amount of spatial amenities (i.e. parks, yards, and parking) a community might have would be reduced. Too little density and the cost of service and infrastructure amenities (i.e. water, sewer, police and fire service, schools, and public transit) would not be offset. It is always a balancing act; but one in which tradeoffs can be made to enhance either side of the equation.

There is no single perfect density. Instead it is a search for an optimum density that will achieve the goals of both individual residents and the community at large. This section presents examples of different types of housing densities currently found in Milwaukee. The purpose of this section is to establish a common reference point for understanding what different types of densities might look like and how they might feel and work. Through the use of photographs and maps, the character and identity of neighborhoods of different densities are documented.

The densities are measured in dwelling units per acre (d.u./ac.). A dwelling unit refers to one home, whether it is a single house or a single apartment or condominium in a complex. For the purpose of this report, the sites are limited to either half blocks (from a street edge back to an alley) or entire blocks. This is a net area since streets are not included. The densities have been rounded off to the nearest half dwelling unit. The locations of all examples are given to allow the reader to visit the site and come to personally understand the realities of different types of densities.

Of the two types of maps used for each example, the Land Use maps showing the number of dwelling units are relatively up to date. The maps showing the footprints of dwellings were generated by the Southeastern Wisconsin Regional Planning Commission using data from aerial photographs taken several years ago. These have not been updated. Where the Land Use maps contradicted the SEWRPC maps, the SEWRPC maps have been updated to match.

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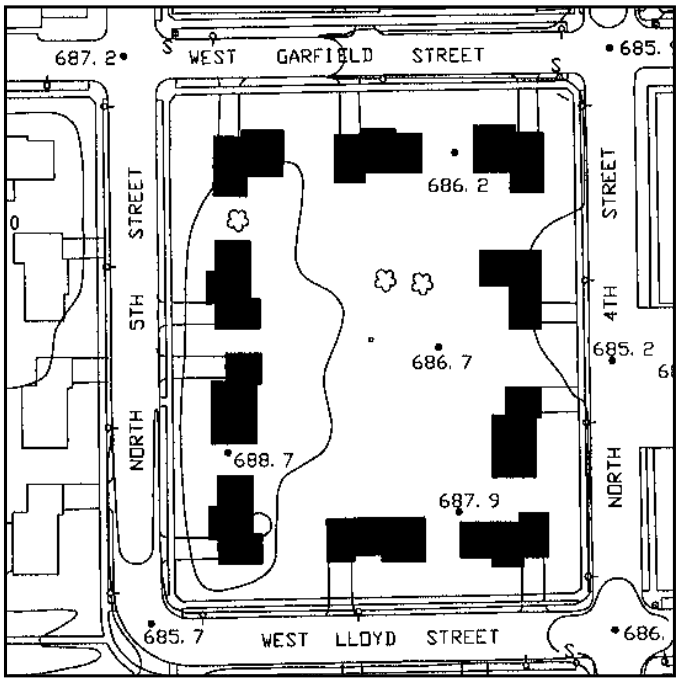
View looking southwest from the corner of Garfield Avenue and 4th Street, Halyard Neighborhood

3-1/2 Dwelling Units/Acre

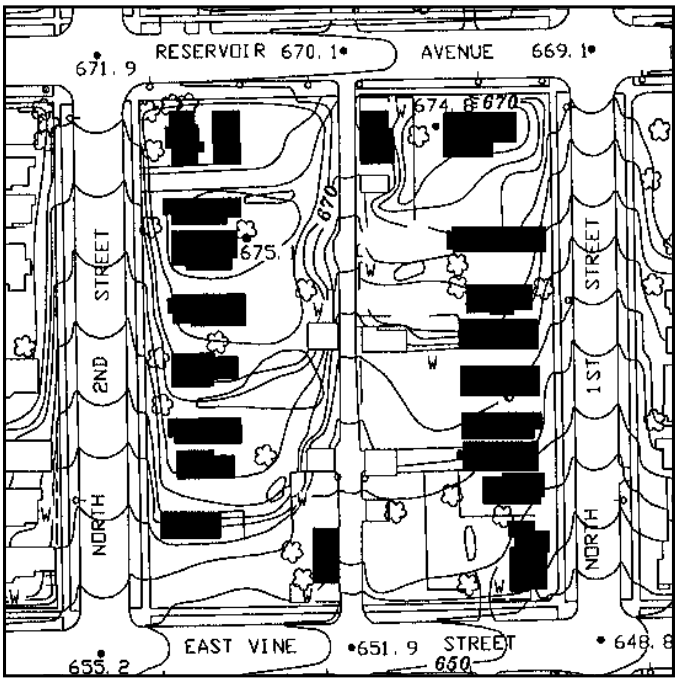
This block consists of suburban style single family homes. By their very nature, these low sprawling houses require large lots, hence the suburban feel to this block. At 3-1/2 d.u./ac. this is perhaps one of the least dense neighborhoods in Milwaukee. This density is characteristic of automobile dependent developments.



View looking northeast from Vine and 2nd Streets, Brewers Hill Neighborhood.

10 Dwelling Units/Acre

In order to maintain larger lot sizes, and thus a lower density, this block has an equal number of single family units to Milwaukee duplexes (one unit above the other). Although considered by many to be urban, this density is more on the scale of the streetcar suburbs from the end of the 19th Century.



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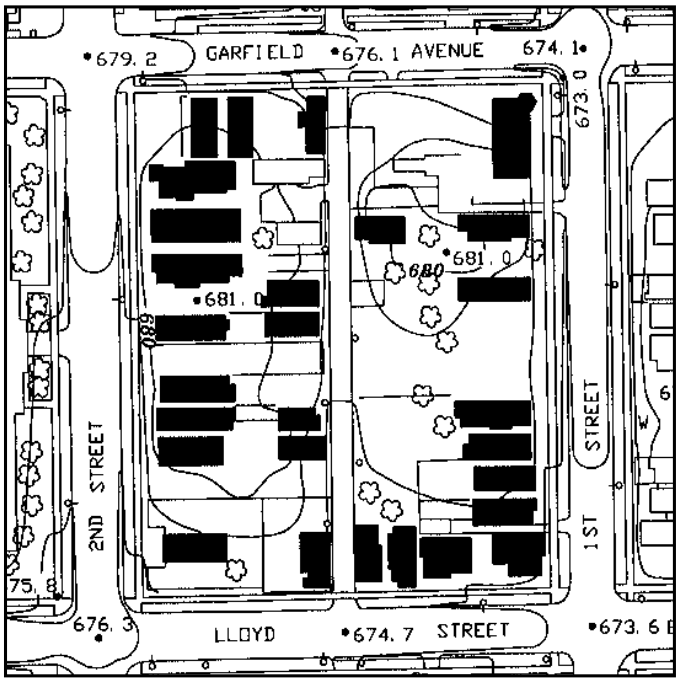
View looking southwest from Garfield Avenue and 2nd Street, Brewers Hill Neighborhood

20 Dwelling Units/Acre

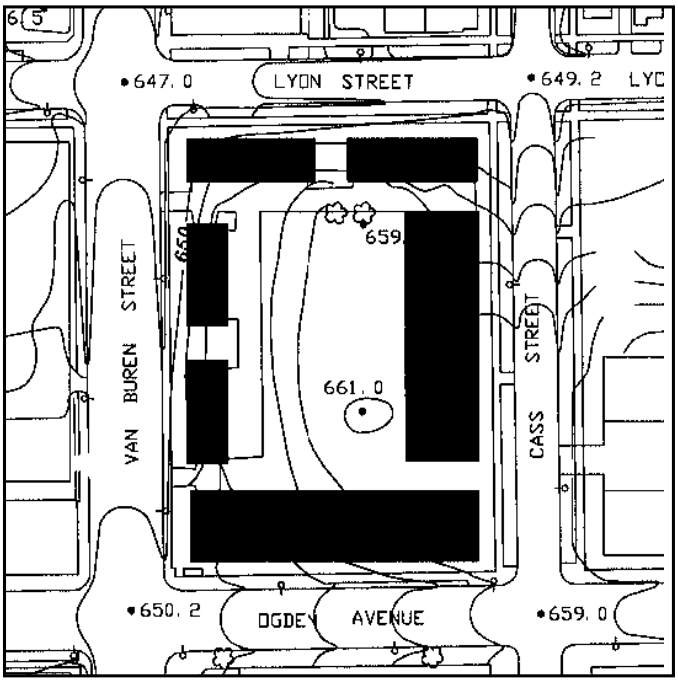
Tighter lot sizes, the appearance of multi-family buildings (3 or more units in a building), and a mixture of single family residences, Milwaukee duplexes, and rear-lot dwellings have created an undeniable urban density on this block.



View toward southeast from Lyon and Van Buren Streets, Lower East Side Neighborhood

38 Dwelling Units/Acre

A combination of townhouses and apartments, this block moves beyond what is achievable with simple freestanding housing. The majority of parking is accommodated with interior block parking and platform parking (parking below the apartment blocks). The scale of the buildings has also begun to move beyond that of the typical Milwaukee two story home or duplex.



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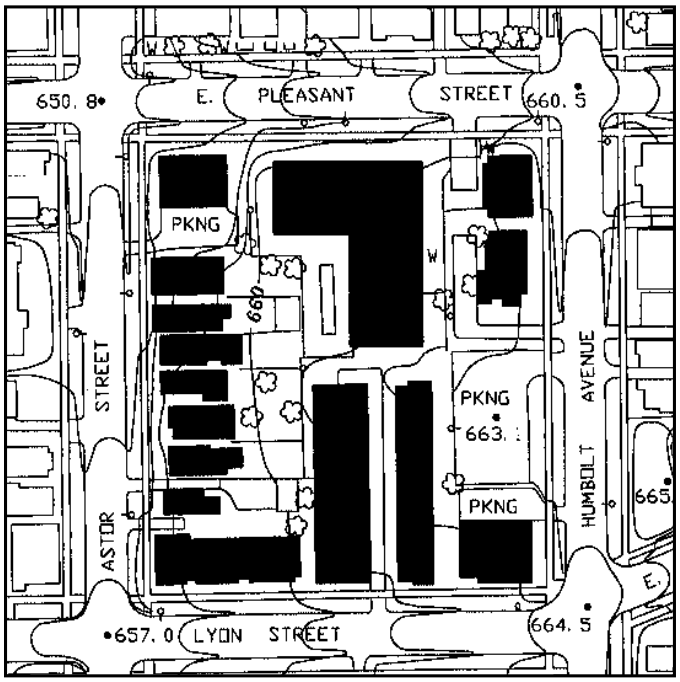
View of townhouses and apartment blocks on Lyn Street between Astor and Humboldt, Lower East Side Neighborhood

60 Dwelling Units/Acre

Despite the several single family homes and duplexes, this block achieves its high density through the use of townhouses and both large and small apartment blocks. Parking for the townhouses is located underneath each unit. Parking for the apartments is either on the street, or in the private lot on the east side of the block. The amount of parking needed is partially tempered by the realization that not every tenant will have an automobile in this urban environment.



3.2 Surrounding Built Context

3.2.1 Introduction

The neighborhoods surrounding the Beer Line "B" development site are a compilation of building types which were derived from several influencing factors including the site, social and economic conditions and market forces. The following photographs and descriptions provide a partial survey of the predominant building types found in these neighborhoods. These building types constitute the starting point for understanding how to design and build at the Beer Line "B" site so new development may harmoniously blend with the surrounding neighborhoods. An Architectural Code using these existing building types as precedents is included in Chapter 5.3.

3.2.2 Existing Building Types

Single Story Worker's Cottage
This is the simplest and smallest residential type. It followed the narrow and deep proportions of the typical lot, and was constructed usually in wood and occasionally in brick.

Polish Flat
The single story worker's cottage on a raised foundation which allows at-grade entrance to a separate living space in the basement. This space was often used by relatives or rented out as a means of helping a homeowner offset the cost of the home.

Bungalow
Extra floor space is economically provided within what normally would be attic space of this residential type.

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Two Story Home
A compact floor plan of this residential type is maintained by spreading it over two floors. Steep pitched roofs with the use of dormers allowed attic space to be converted into extra living space as a family grew.

Two Flat
One flat above, the other below, this type is often indistinguishable from the two-story home except for the second entry door off of the porch. Typically the second floor flat is provided with a balcony over the first floor front porch.

Rear-Lot Home
A second house built on the back half of the typical deep Milwaukee lot. It provided an additional source of income for the main house at the front of the lot, and could also provide housing for relatives. From the street, one typically does not know of its existence.

Townhouse
Larger than a mansion apartment building, but similar to row housing except there is no formal visible division between units. Each unit has its own street entry, and includes space on the floors directly above and below the individual entries. Usually built of masonry construction.

Mansion Apartment
A small apartment building consisting of only a few units, but resembling a large mansion. Unit entries are often clustered behind one or more main entries. Each unit typically has a unique floor plan, and may be on more than one floor.

Perpendicular Apartment Block
Responding to the typical Milwaukee lot, this type of apartment block has a narrow street elevation, but extends deeply into the lot. The overall mass of the building is perpendicular to the street. It is always constructed of masonry construction.

Parallel Apartment Block
Unlike the Perpendicular Apartment Block, this type runs parallel to the street with one or more "fingers" stretching back into the block. Its massing is often articulated or broken down to reduce its visual impact on the street, but the impression given is still that of a wall along the street. This type is always constructed of masonry construction.

Mixed-Use
These buildings are often small retail establishments (i.e., taverns and grocery stores) with living quarters above. Except on commercial streets, which are typically lined with this building type, mixed-use buildings typically appear on corners where they can be pulled to the sidewalk edge and face on two streets. Predominately built of masonry construction, wood frame examples do exist.

Courtyard Apartment Block
A 'U' shaped apartment building occupying several lots. A central courtyard between the arms of the 'U' faces the street and is often the location of the entries to each arm of apartments. This type is always constructed of masonry construction.

Civic/Institutional
These types include schools, churches, libraries, firehouses and other public or municipal buildings. They are predominately large masonry structures with extensive ornamentation. They are the landmarks of their neighborhoods, and occasionally the city.

Industrial
Often accommodating manufacturing, warehousing, and the accompanying office space within one structure, these masonry structures were simply ornamented to celebrate what they were. They were often of a higher and more permanent quality of architecture than is currently the case with industrial buildings.

3.3 Site Access

3.3.1 Introduction

As defined in the Milwaukee Riverlink Guidelines, access encompasses physical access, psychological access, visual access, and economic access. This section utilizes the same approach to summarize access issues with regards to the Beer Line "B" site. The site itself poses significant challenges due to its linear nature, limited access points, and the topographic constraints of the bluff.

3.3.2 Physical Access

Vehicular
Topographically, the site's most buildable areas have been confined to the flat expanse between the toe of the bluff and the river. Vehicular access follows the toe of the slope and is limited to Commerce Street, a generous two-way street, approximately 30 feet wide. Commerce Street connects at the southwest end of the site to Pleasant Street, and at the northeast end of the site to Humboldt Avenue. Presently there are no streets intersecting Commerce Street within the site. The Holton Street Viaduct soars over and visually bisects the site, but does not provide a vehicular connection. The orthogonal neighborhood street grid of Brewer's Hill, adjacent to the site, ends at the top of the bluff before penetrating the site. No vehicular access is available from Kilbourn Park down the bluff.

The intersections of Commerce Street and Pleasant Street to the south and Humboldt to the north are of great importance to the integration of this project to the existing fabric of the City. The Commerce and Pleasant Street connection is a T-intersection with the alignment of Commerce Street. In the master plan, the connection at Humboldt Avenue is envisioned as an at grade, perpendicular intersection north of its present location. A service road is maintained on the current Commerce Street alignment to allow access to the existing businesses next to the Humboldt Avenue bridge as well as sites east of Humboldt Avenue and via the existing spiral grade change.

Major circulation routes in the vicinity of the project area include North Avenue to the north and Water Street on the southeast side of the Milwaukee River. Major north-south routes include Palmer Street on the west (which becomes Pleasant Street at Commerce Street); Holton Street; and Humboldt Avenue.

Pedestrian and Bicycle
Pedestrian and bicycle circulation within the project area is unofficial at best. The only street within the project area, Commerce Street, is partially unimproved and lacks sidewalks east of Holton Street. The old railroad bed that traverses the site along the bluff can be used by pedestrians and bicyclists . Currently, there is no direct pedestrian connection between Kilbourn Park and the project area. The Holton Street Viaduct, which crosses over the site, has a pedestrian staircase down to Commerce Street.

Water
Historically, the Milwaukee River was the dominant geographic feature of early Milwaukee as described in Section 2.3. After the "straight cut" or new harbor entrance was completed in 1857, large vessels were able to enter the river and it was navigable as far as the Humboldt Avenue Bridge. Today, the riverfront adjacent to the project area is still navigable, allowing the potential for large and small boat access to the site. The river flows from northeast to southeast and outlets into Lake Michigan.

3.3.3 Psychological Access

Psychological access addresses whether a place is inviting or intimidating. Today, this undeveloped, unkempt and largely vacated project area is psychologically uninviting. The lack of public amenities, in addition to the lack of people utilizing the site adds to a feeling of insecurity. The steepness of the bluff that runs along the northern edge of the site further isolates this area. Given the site's key position between the river and adjacent neighborhoods, new development has the potential to create a barrier between the two unless new connections are explicitly created.

3.3.4 Visual Access

The project area's natural topography makes this site an important visual amenity for the community. The site's location on the river, coupled with a dramatic bluff backdrop, makes for a unique setting in Milwaukee. The view opportunities to the southeast from the heights of the Holton Bridge, as well as from the Pleasant Street and Humboldt Avenue bridges, are especially impressive.

3.3.5 Economic Access

The project area is currently underutilized in terms of accommodating different economic groups, land uses and economic sectors. The site is generally vacant, except for four buildings. These existing buildings appear to be structurally sound and are candidates for adaptive reuse. Two of the buildings have already been converted.

3.4 Riverfront/Riverwalk

3.4.1 Riverfront

Riverfront Condition

The study area is bordered by a 3,400 foot reach of the Milwaukee River, which flows in a southwesterly direction. The riverfront shoreline conditions, which are illustrated on Figure 3.4.1, include sections of shoreline that slope to the river with no structural treatment, vertical concrete retaining walls in varying conditions, timber walls in fair to poor condition, and steel sheet pile that is generally in good condition.

Figure 3.4.1

The downstream edge of the site is approximately 2.5 river miles from Lake Michigan. There are no obstructions such as dams between the river at the site and the lake. In addition, the gradient of the river is very mild, so the elevation of the river is controlled to a significant extent by the water level changes in Lake Michigan. Consequently, lake level changes provide a reasonable guide to river water levels in the study area. U.S. Army Corps of Engineers data indicate that the average annual lake fluctuation is 1.0 feet. As of spring, 1997, the water level was 580.5 ft IGLD (International Great Lakes Datum). The maximum high water level, in 1986, was 582.4 ft IGLD, and the minimum low water level, in 1964, was 576.2 ft IGLD. The IGLD datum is approximately sea level, so the maximum and minimum water levels of the river along the study area will be only slightly higher than the lake levels. The river width ranges from 160 feet to 200 feet wide in the study area.

The shoreline conditions within the study reach are described in Figure 3.4.2 below from downstream at Pleasant Street to upstream at Humboldt Avenue.

Each of the conditions summarized in Figure 3.4.2 are described in more detail below. Photographs illustrating the site conditions are also cited.

The shoreline treatment upstream of the Pleasant Street bridge (the downstream boundary of the study area, as shown in Figure 3.4.3) begins with approximately 430 feet of concrete wall in fair to poor condition. The water is at least 17 feet deep in this area, and the wall is approximately 3 feet above the water. The concrete has deteriorated to the extent that the steel reinforcement is exposed along significant sections of the wall. This

Shoreline Treatment	Length	Condition
Concrete Wall	430'	Concrete wall face in fair to poor condition along significant sections of this reach. Significant steel reinforcement exposure.
Sheet Pile	400'	Sheet pile in good condition.
No Structural Treatment	90'	Bank slopes into river at slope of 2:1 or steeper. Bank up to 6' above water.
Sheet Pile Wall with Concrete Cap	350'	Sheet pile and concrete cap in good condition.
Timber Wall	80'	Timber walls in poor condition, leaning into river.
Concrete Wall	600'	Concrete wall generally in good condition, with minor chipping along edges and corners.
No Structural Treatment	300'	Bank slopes into river at slope of 1:5:1 or steeper. Bank is a minimum of 10' above the water.
Sheet Pile Wall	870'	Sheet pile in good condition; cap needs repair or replacement.
Concrete Wall or No Structural Treatment	200'	Concrete wall either missing or leaning into river.
Sheet Pile Wall	80'	Sheet pile in good condition; cap needs repair or replacement.

Figure 3.4.2 • Milwaukee River Shoreline Summary (from Pleasant Street Bridge to North Humboldt Avenue)

deterioration is illustrated in Figure 3.4.4. Note that many of the shoreline treatments described as "concrete walls" in this study area are likely substantial concrete caps on top of steel sheet pile. This is likely the case because steel sheet pile construction is generally more appropriate than concrete walls for the water depths of 8 to 17 feet that were measured next to the wall during the field investigation. This presumption will need to be verified by a future detailed underwater site inspection.

Upstream of this section is approximately 400 feet of steel sheet pile in good condition. The water is at least 12 feet deep in this area, and the wall is approximately 2 feet above the water. Upstream of this section is approximately 90 feet of untreated shoreline, which is lined with vegetation, soil, and some construction debris. The bank slope of this area is 2:1 or steeper. The shoreline was not accessible in this area, so water depths were not obtained. The area is illustrated by the vegetated portion of riverfront in Figure 3.4.5.

Upstream of this section is approximately 350 feet of steel sheet pile, capped by concrete, that is in good condition. The water is at least 9 feet deep in this area and the wall is approximately 3 feet above water. This is the riverfront condition adjacent to the apartments that are currently under construction, as illustrated in Figure 3.4.6. Upstream of this concrete and sheet pile shoreline is approximately 80 feet of timber wall in poor condition. The walls are leaning into the river, and the sinkholes next to the walls indicate soil is eroding into the river through cracks between the horizontal timbers. The water is at least 8 feet deep in this area, and the wall height is between 3 and 4 feet above the water. This shoreline is illustrated in Figure 3.4.6, to the right of the new apartment conversion shoreline.

The next section upstream is a 600 foot section of concrete wall that extends beneath the Holton Street Viaduct. This section of the shoreline is in fair to good condition, with some crumbling of the concrete and small sections of exposed steel reinforcement. The water depths ranged between 9 and 13 feet deep in this area, and the wall heights ranged from 3 to 4 feet above the water. Upstream of this section is a 300 foot reach of shoreline that has no structural treatment. This area is illustrated by the vegetated shoreline area shown on Figure 3.4.7. The bank slopes into the river at a slope of 1.5:1 or steeper, and the bank is a minimum of 10 feet above the water.

Upstream of the unprotected shoreline is an 870 foot reach of sheet-pile-protected shoreline. The sheet pile is

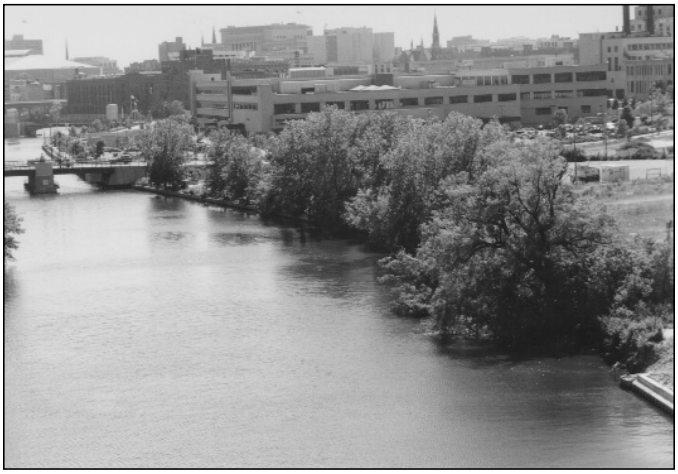


Figure 3.4.3

in good condition, although the wooden cap is either missing or in need of repair. The water depths range between 12 and 17 feet deep in this area, and the wall height is 4 feet above the water. This section is illustrated by the right side of Figure 3.4.7.

Figure 3.4.4

Upstream of the previous section is a 200 foot reach that is characterized by either a low, 2 foot high concrete wall that is leaning into the river, or by no treatment at all, with slopes that are 1:1 or steeper, that are eroding into the river. There are numerous cracks in the wall. The water depth measurement taken in this area was 15 feet deep. Upstream of this section is 80 feet of sheet pile wall in good condition, although the cap is missing or in need of repair. The water depth is 12 feet deep in this area, and the wall is 4 feet high. The upstream end of this section abuts the Humboldt Avenue bridge, which is the upstream end of the study area.

Figure 3.4.5

Riverfront State and Federal Permitting Issues

In addition to City of Milwaukee permits necessary for the area development to proceed, this project will require environmental permits and approvals from State of Wisconsin and Federal agencies. The state permitting system is coordinated by the Wisconsin Department of Natural Resources (WDNR); the U.S. Army Corps of Engineers (USACE) administers the federal program.

A WDNR permit is required under Chapter 30, Wisconsin Statutes, for work performed on a navigable waterway of the State. For the Beer Line "B" project, a Chapter 30 permit will be required for any work in the Milwaukee River waterward of the Ordinary High Water (OHW) mark of the river. This level is usually field-interpreted by a WDNR water resources specialist or a consultant knowledgeable of the WDNR interpretations of navigability. Final interpretation of the OHW mark rests with the WDNR. Project work that would occur waterward of the OHW, and thus require a Chapter 30 permit, includes replacement or repair of vertical structural walls (bulkheads) placed riverward of the existing bulkheads. Placement of rock revetment, to create new shoreline protection or repair existing revetments, into the water would also require a Chapter 30 permit.

Figure 3.4.6

A Chapter 30 permit application is coordinated on the WDNR district level, and requires an application form, drawings, and a public notice published by the applicant in the local newspaper. A pre-application meeting with the WDNR field representative is strongly advised. The application process typically takes two to six months.

Federal permits are required by Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act for any activities in navigable waters of the U.S., including wetlands. Because wetlands have not been identified at the Beer Line "B" site, they do not appear to be a permitting issue. However, as with the State of Wisconsin permitting program, a federal permit will be required for work performed in the Milwaukee River, including shoreline stabilization. If the existing river bulkhead or revetment has fallen into disrepair to the extent that wetlands have developed, a federal permit will be required for work in these wetlands even if they are landward of the OHW mark.

local agencies and adjacent property owners. As with the State permitting process, pre-application consultation with agency personnel is strongly recommended.

If a federal permit is required, the project must also receive water quality certification from the WDNR, required by Clean Water Act Section 401. The federal application package must be submitted to the WDNR for this certification. The WDNR has a 30-day period to issue or deny water quality certification; if the agency does not act within that time frame, certification is obtained by default.

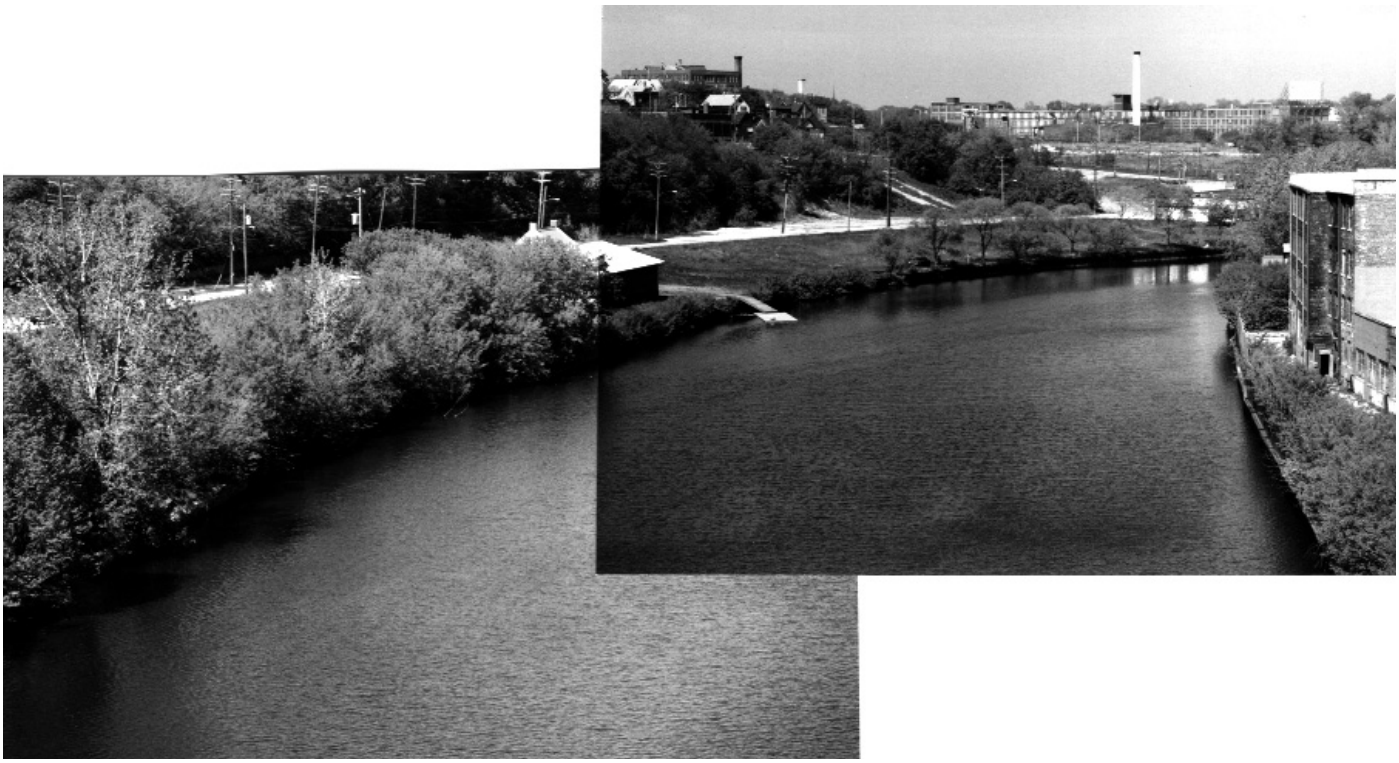


Figure 3.4.7

A federal permit application is coordinated with the local USACE office, located in Waukesha. A nationwide permit may be available if the extent of work on the riverfront is limited. Typically, an application includes a completed joint (state-federal) application form, plan view and cross section drawings, and a descriptive letter. The USACE project manager will determine the appropriate approach for use of a nationwide or individual permit. The permit process for an individual permit typically takes six months or more and requires a public notice (issued by USACE), whereas a nationwide permit can be issued within approximately two months with notice limited to federal, state, and

The WDNR also regulates activity within its city and village shoreland-wetland protection program under NR 117, Wisconsin Administrative Code. This regulation limits the type and extent of development within 300 feet of a navigable river or stream. However, the City of Milwaukee shoreland-wetland protection program will, if more restrictive, supersede the WDNR program requirements.

3.4.2 Riverwalk

Although no riverwalk treatment currently exists in the

project area, the riverwalk is developed up to the north boundary of the property directly downriver. (the southern boundary of the project area) As proposed by the 1992 Milwaukee River Link Guidelines, a Riverwalk is intended for both sides of the river along this reach and continuing upriver. This study strongly supports the earlier concept. Because of the confined borders of the site and limited development parcels the anticipated riverwalk easement width is 15 feet.

3.5 Existing Civil & Utilities Analysis

3.5.1 Sewers

North Commerce Street is the primary corridor for almost all utilities including three major sanitary collector sewers as shown on Maps 3.5.1 through 3.5.4. They were installed along this route to convey sanitary flows as well as storm flows to the Jones Island Treatment Plant. These systems were interconnected at various locations and also had overflow outfalls to the Milwaukee River for relief during rainstorm events. The Deep Tunnel was constructed under the area westerly of North Commerce Street to collect and divert the excess storm flows from these systems for storage and later treatment. There are no separate storm sewers since the roadway inlets are connected to the above systems.

The properties along the local streets west of the former railroad line are all served by combined sewers which ultimately connect with one of the collector sewers in North Commerce Street. Any development adjacent to North Commerce Street will require separate sewer(s) connection(s) to existing manholes on these systems. It may not be realistic to provide a lateral connection for a single or duplex unit into these sewers at random because of the other conflicting utilities and the fact that the depths to the top of sewer pipes are 13 feet, 19 feet and 6 feet for the 36" MIS, 42" combined sewer and the 96" collector sewer, respectively.

Within the project length, there are two drop-shaft facilities which connect the collector sewers in North Commerce Street to the Deep Tunnel. These drop-shaft facilities include a junction chamber, control building, trash rack structure, approach channel, drop-shaft, deaeration chamber, air vent and connecting tunnel. Drop-shaft NS-7 is located east of North Commerce Street about halfway between the North Humboldt Avenue and North Holton Street bridges. There are permanent Milwaukee Metropolitan Sewerage District (MMSD) easements for these facilities as shown on the attached maps. Drop-shaft NS-8 is located on the west side of North Commerce Street north of the Palmer Street/Pleasant Street intersection. The Deep Tunnel and those facilities are all on property owned by MMSD. MMSD had acquired all of the lands of the CMC Corp, which includes the railroad lands west of North Commerce Street from North Palmer Street to North Humboldt Avenue.

There are also four permanent easements over the outfall sewers between Commerce Street and the Milwaukee River as shown on Maps 3.5.1 through 3.5.4.. These were initially developed and owned by the City of Milwaukee but are now under MMSD control.

3.5.2 Water Supply System

There is a single 16-inch Ductile Iron Watermain in North Commerce Street between East Pleasant Street and North Humboldt Avenue; no cross-connections to other parts of the system along the entire 4,000-foot plus length exist. See Maps 3.5.1 through 3.5.4 which summarize the existing water supply system. There are eleven hydrants serving Commerce Street at random spacing with the maximum distance between hydrants being 600 feet.

The properties along the local streets west of the former railroad property are all served by a grid system of 6-inch ductile iron pipe which is supplied from the reservoir in Kilbourn Park by larger transmission lines. The area of this grid system is on a bluff approximately 60 feet above North Commerce Street and since the area between was occupied by the railroad, no reasonable route for interconnection of the systems was necessary.

There may be a future tie in from East Reservoir Avenue to North Avenue, but no route has as yet been identified.

The reservoir in Kilbourn Park will be taken off line and demolished in the future due to a heavy leakage problem. Thus, storage tanks will be necessary. The location of these tanks has not yet been identified.

3.5.3 Electrical Utilities

Wisconsin Electric Power Company has eliminated the overhead system and placed it underground as part of the reconstruction of North Commerce Street from East Pleasant Street to North Holton Street. This may also occur as part of the proposed reconstruction of North Commerce Street from North Holton Street to North Humboldt Avenue.

All existing Ameritech facilities are currently aerial. Ameritech will join Wisconsin Electric Power Company in transferring their overhead facilities to the same conduit system along North Commerce Street. No other changes are planned at this time.

Milwaukee Bureau of Electric Services will transfer overhead facilities to underground facilities behind the proposed curb as part of reconstruction of North Commerce Street from North Holton Street to North Humboldt Avenue. No other changes are planned at this time.

Maps 3.5.5 through 3.5.8 illustrate existing electrical utilities in the project area.

3.5.4 Gas

Wisconsin Gas Company facilities are in service in North Humboldt Avenue (12-inch and 3-inch), East Garfield Avenue (2-inch), North Bremen Street (3-inch), East Reservoir Avenue (2-inch), East Glover Avenue (2-inch and 4-inch), East Pleasant Street (8-inch), North Palmer Street (8-inch), East Vine Street (2-inch), North Commerce Street from East Pleasant Street to North Holton Street (8-inch and 6-inch), and in North Commerce Street from North Humboldt Avenue to approximately 500 feet South (3-inch). There is no existing service in North Commerce Street from North Holton Street to approximately 500 feet South of North Humboldt Avenue. This section will have to be considered prior to reconstruction of North Commerce Street between North Holton Street and North Humboldt Avenue.

See Maps 3.5.5 through 3.5.8 for existing gas.

3.5.5 Streets

Existing conditions of project-area streets and modifications anticipated in the near future are described below and illustrated in Maps 3.5.1 through 3.5.4. North Commerce Street from East Pleasant Street to North Humboldt Avenue is presently a 36 foot wide concrete pavement roadway located within a 66-foot right-of-way. The lands westerly of the west right-of-way rise to the top of the bluff along East Reservoir Avenue. The lands are supported by a series of sheet pile and/or concrete retaining walls constructed by the railroad company to support their tracks. These walls appear to be in good condition with the lowest wall being adjacent to the North Commerce Street west right-of-way from East Pleasant Street to North Holton Street. This section of wall is steel sheet piling. To the north of North Holton Street the wall is a sloped concrete retaining structure and is offset from the right-of-way. It should be noted that the lands of the former Railroad were acquired by MMSD and are the route for the Deep Tunnel which currently conveys storm runoff.

North Commerce Street generally parallels the Milwaukee River and can be accessed only at East Pleasant Street and via a "jug handle" connection to North Humboldt Avenue. The street passes below the North Holton Street viaduct and North Humboldt Avenue roadway. North Commerce Street becomes Riverboat Road east of North Humboldt Avenue and is a dead-end roadway approximately 1,350 feet long.

North Commerce Street from North Holton Street to North Humboldt Avenue will likely be reconstructed in 1999 as a continuation of the 1997 work. The existing alignment will generally be followed except at North Humboldt Avenue where an at-grade intersection or "jughandle" in the northwest quadrant is being considered. It is anticipated that ornamental street lighting using Milwaukee Lanterns and Harps will be provided, and street trees will be provided as part of these improvements. East North Avenue between North Bremen Street and North Booth Street is scheduled for reconstruction in 1999 and will include realignment to smooth the curve south of the reservoir.

East Vine Street from North Hubbard Street to Dr. Martin Luther King Drive is scheduled for the reconstruction in 2000.

Street vacations currently being considered are the unimproved East Vine Street east of North Hubbard Street, and the unimproved East Reservoir Avenue south of North Buffum Street.

Additionally, there is a new street extension planned from Hubbard to Palmer, currently scheduled to be

completed some time in 1999 or 2000.

3.6 Preliminary Environmental Evaluation

A preliminary environmental evaluation was completed for this project to assess the environmental conditions of the Beer Line "B" site, how the environmental conditions of the project area may affect redevelopment opportunities of specific parcels, and how the conceptual plans for the project could be integrated with existing environmental challenges to minimize redevelopment costs. The preliminary environmental evaluation consisted of a review of available information for the Beer Line "B" site and a limited Phase II Investigation. The results of the preliminary environmental evaluation are presented in the Appendices, Section 6.2.

The evaluation was initiated by reviewing existing historical information for the project area as well as developing a limited Phase II scope of work to assess environmental conditions relating to possible soil and groundwater contamination sources. The Phase II scope of work included drilling fourteen soil probe borings, analytical testing of soil samples, sampling of five temporary wells and analytical testing of groundwater samples.

Readily available, existing information and limited Phase II investigation results were used to develop our opinions on environmental conditions and risks. A thorough review of existing site information and possibly site-specific soil and groundwater testing may be prudent for all the sites to address purchaser specific concerns. Additional exploration will be necessary to evaluate management alternatives for the soil and groundwater issues identified by this study.

3.7 Existing Geotechnical Conditions

3.7.1 General Geology

The study area is situated along the western banks of the Milwaukee River Valley. The earth materials consist of Quaternary deposits of fill, post-glacial and glacial soils overlying Devonian-age bedrock. For a complete report regarding the geotechnical conditions for the site refer to the Appendices, Section 6.3.

Bedrock in the study area consists of Devonian-age rock called the Milwaukee Formation and Thiensville Formation. The Milwaukee Formation ranges in thickness from 20 to 50 feet and is typically found within an elevation range of minus 40 to minus 90 feet, Milwaukee City Datum. The Thiensville Formation underlies the Milwaukee Formation. It has a thickness ranging between 65 and 75 feet and is typically found within an elevation range of minus 150 to minus 170 feet, Milwaukee City Datum.

3.7.2 Soil and Groundwater Conditions

Soil conditions in the study area were assessed using the general geologic information from available boring logs. Approximately 90 boring logs were found and are located as shown in Figures 6.3.4 and 6.3.5. The borings are not attached to this report, but are available for review through the Department of City Development.

The soil conditions in the study area can be generalized into three zones. The approximate boundaries of these zones are shown in Figures 6.3.4 and 6.3.5. Zone A soils border the river along most of the study area. Zone B soils are found along Commerce Street and along the river towards Humboldt Avenue. Zone C soils are bluff soils located west of Commerce Street.

Zone A and B Groundwater Conditions

The groundwater table within the valley areas of Zones A and B is typically found at and within a few feet above the Milwaukee River level. The water levels are based on the large number of borings and wells that exist or once existed in this area. Generally a slight horizontal gradient towards the river is present. Water levels in this area are likely to fluctuate with river level fluctuations.

Progressively lower groundwater levels are present within the glacial and bedrock aquifers in this area. These lower levels are mostly caused by infiltration into the Milwaukee Metropolitan Sewerage District's Northshore Interceptor deep tunnel.

The groundwater table within the bluff areas of Zones A and B is estimated to range from near the ground surface at some steeply sloped areas (a spring) to over 20 feet deep along the crown of the bluff and along some of the bluff benches. Generally, the groundwater

table is expected to slope downward along the bluff and towards the river.

3.7.3 Previous and Existing Foundations, Excavations, and Underground Structures

Previous Canal and River Bank

Based on various historical references, a canal was dug through the study area in the late 1830's. The approximate locations of the former Rock River Canal and Milwaukee river banks are based on old City plans shown on Figures 6.3.2 and 6.3.3.

The significance of the canal location for new development is the fill material that was placed in it and the former materials that lined the bank. Available boring logs located in the canal area suggest that it was mostly filled with silts and clays, a lesser amount of sand and gravel, and to some extent with cinders, slag and other waste materials. These materials were apparently not compacted.

Figures 6.3.2 and 6.3.3 also show that the former Milwaukee river bank was located a few feet to a few tens of feet northwest of its present dockwall location Buried boulder rip rap may be present at former river bank locations in the study area.

Previous and Existing Structure Foundations

Available records on previous and existing structure foundations in the study area were reviewed. The locations of these structures are shown on Figures 6.3.6 and 6.3.7.

Table 6.3.1 shows that most of the listed buildings and bridges are founded on piles or drilled shafts. Deep foundations were the generally-adopted foundation solution for the type of structures that exist or previously existed in soil zones A and B.

Table 6.3.1 also indicates that abandoned foundations are likely to exist at the former Trostel Tannery building (Ref. No. 7) and at the former warehouse building (Ref. No. 8). Available information indicates that the Trostel building foundations were not abandoned with superstructure demolition. Basement and excavated areas were apparently filled with building rubble and then leveled.

Additional sources of underground obstructions in the area between Commerce Street and the river are the river dockwall and retainage system, and the existing retaining walls. Portions of the dockwall are tied-back to anchor pilings. These pilings are typically located 20 to 40 feet behind the dockwall.

Retaining Walls

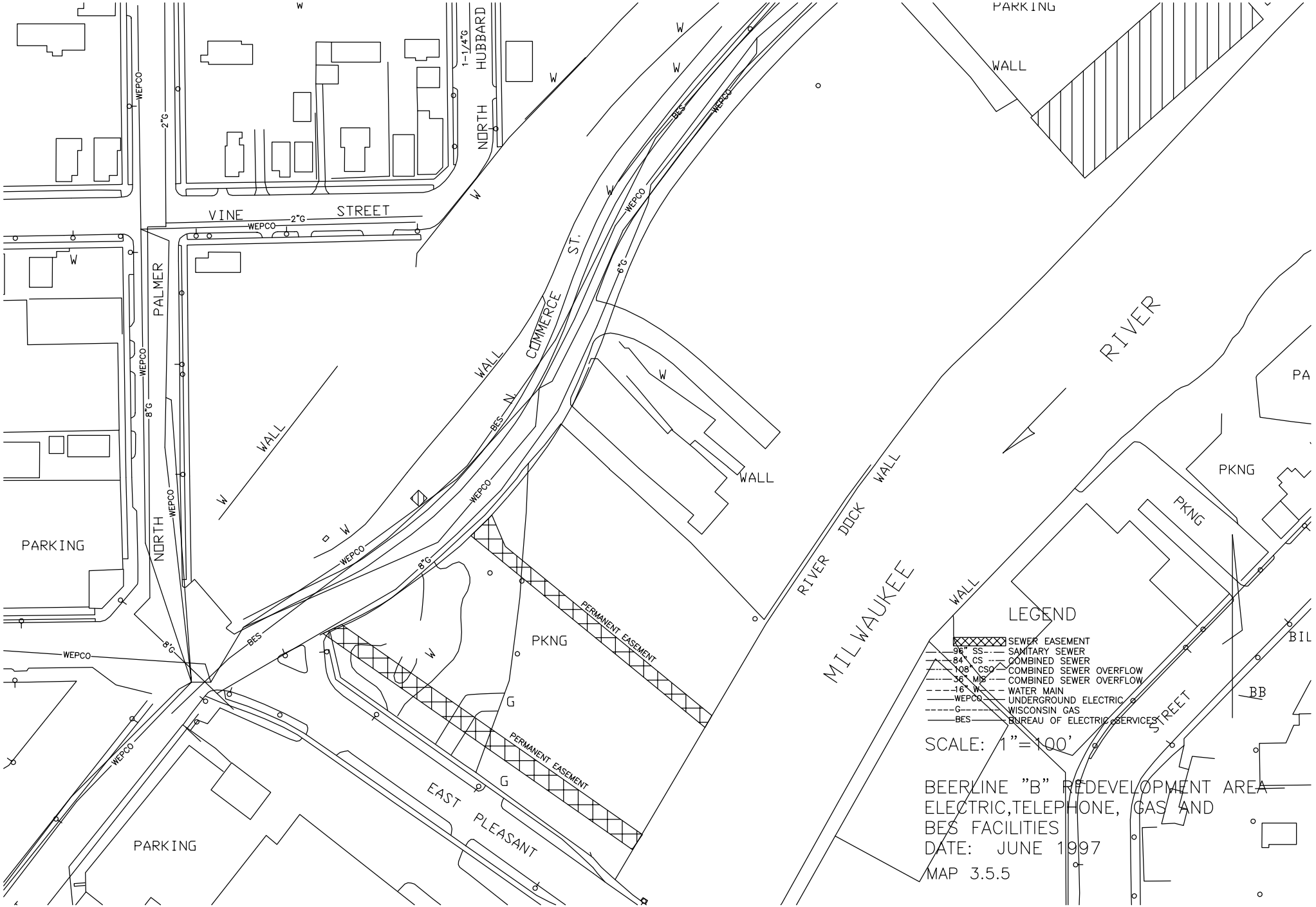
Numerous retaining walls exist in the study area. Most of them are located in the bluff area west of Commerce Street. A fewer number are located between Commerce Street and the River. The bluff area retaining walls were constructed to form benches in the bluff for railroad tracks or to allow roadway construction along the bluff.

The steel retaining walls appear to be cantilevered sheet pile walls. No signs of tie-rods or anchor systems were found. Depths of the sheetpiles are not known, but can be determined by non-destructive, geophysical testing.

The HNTB report identifies retaining walls which are in poor condition and that should be replaced or repaired. Another option for some of these walls may be removal, regrading of the local slope area and then placement of vegetation and other surface erosion protection systems.

3.8 Existing Topographical Analysis

The project area consists of a relatively flat area, bordered by the River on the East and Commerce Street on the West, that comprises approximately two-thirds of the site. In contrast, the topography west of Commerce Street changes dramatically from the flat area to a bluff rising 40 to 75 feet, with an average side slope of 37 percent. Above the railroad bed, the slope ranges from 35 to 60 percent. The 175-to-200 foot-wide bluff is the most significant topographic feature in the project area; it constrains land use and development but affords long views. The bluff not only provides wonderful views of the downtown and river, but also creates challenges in terms of physical access and community linkages. The bluff is unique to downtown Milwaukee, since major topographic relief is limited to the river valleys and lakefront. In addition, the bluff is traversed by the historic remnants of the former Milwaukee Road's Chestnut Street line, the "Beerline. " As a result of this historic use, the bluff is bisected by the old railroad bed, including numerous retaining walls of varying materials.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SEWER EASEMENT
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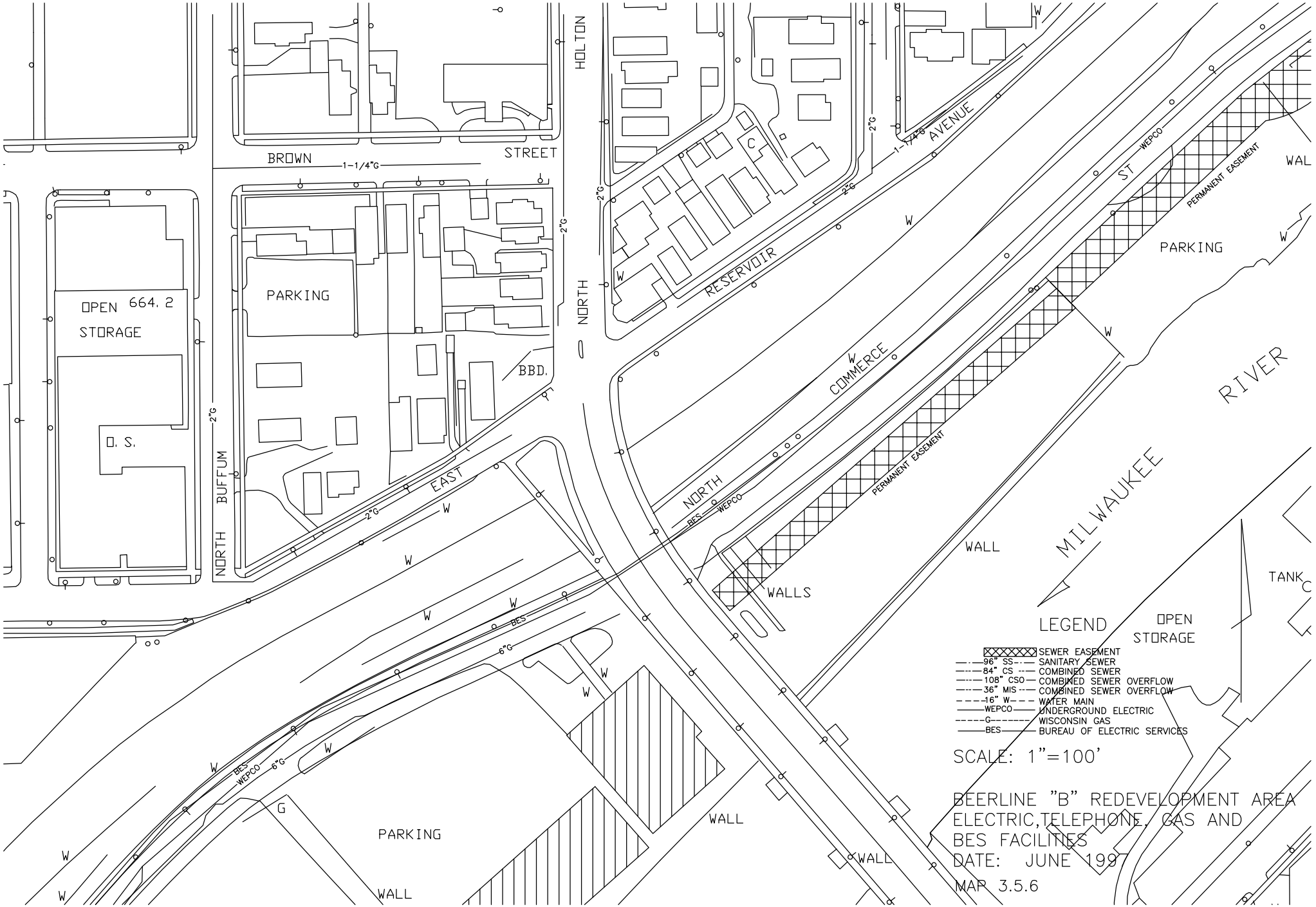
84" CS COMBINED SEWER
108" CSO COMBINED SEWER OVERFLOW
36" MIS COMBINED SEWER OVERFLOW
16" W WATER MAIN
WEPCO UNDERGROUND ELECTRIC
G WISCONSIN GAS
BES BUREAU OF ELECTRIC SERVICES
SCALE: 1"=100'
BEERLINE "B" REDEVELOPMENT AREA
ELECTRIC,TELEPHONE, GAS AND
BES FACILITIES
DATE: JUNE 1997
MAP 3.5.5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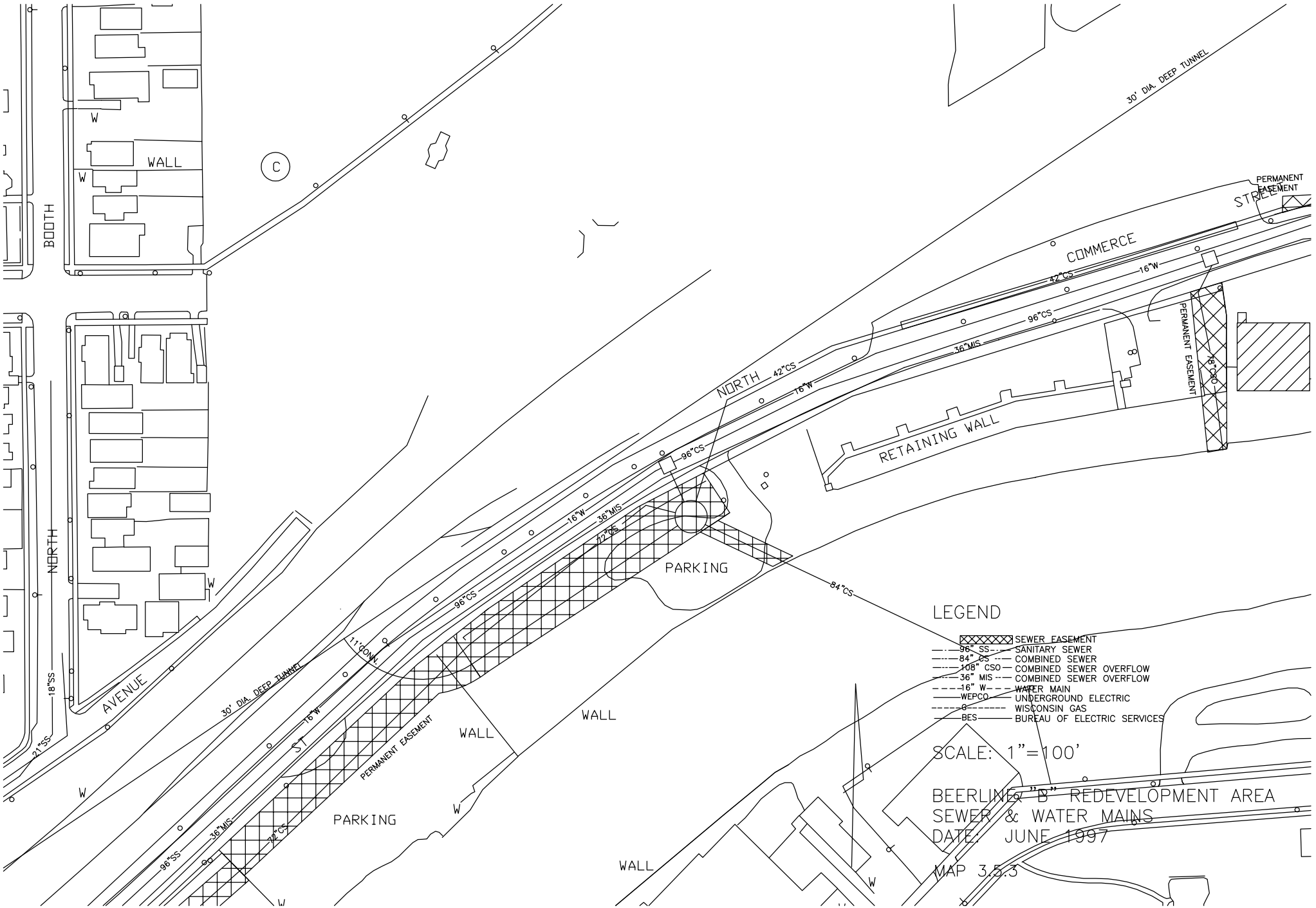
MAP 3.5.6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PARKING
84"CS
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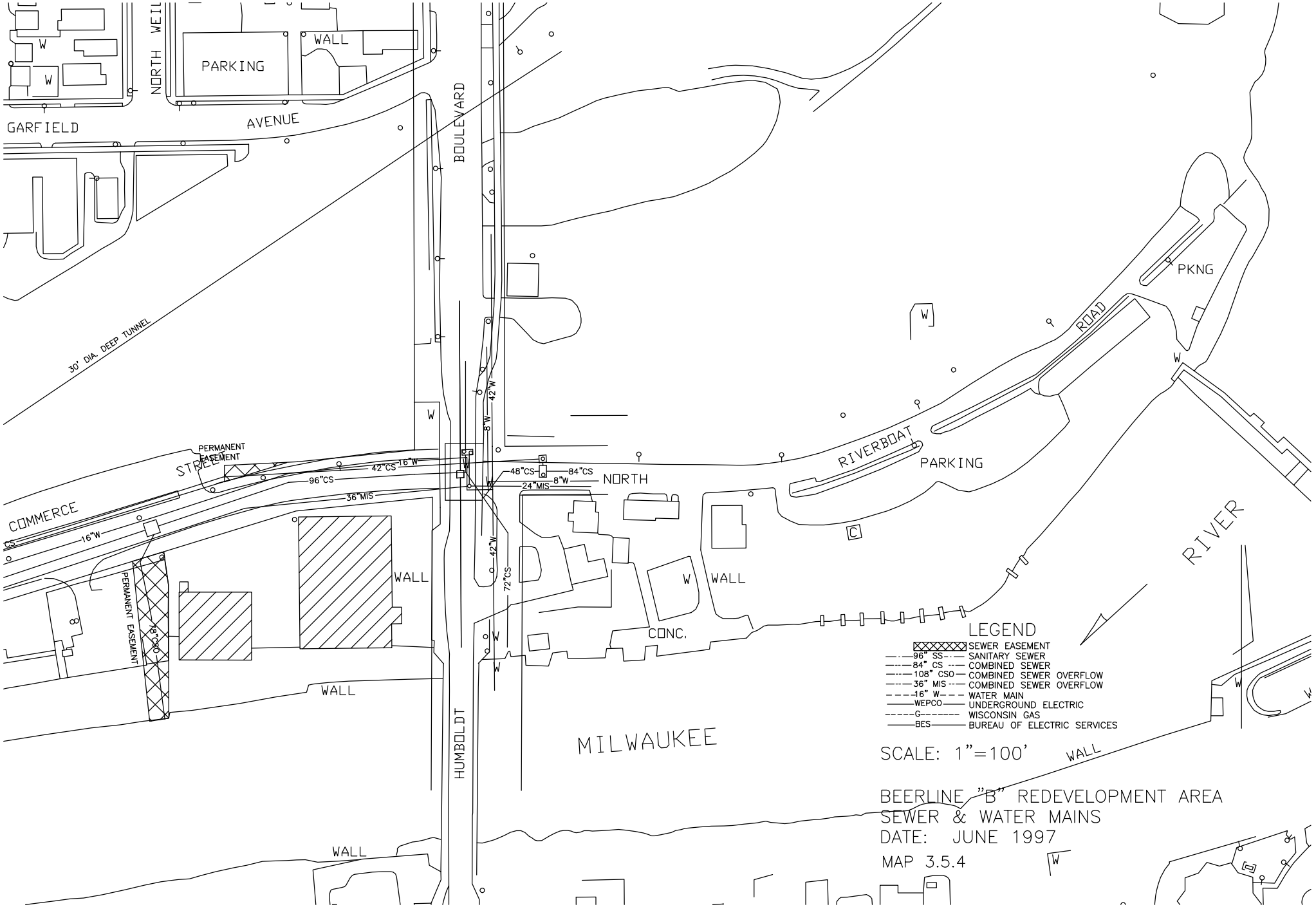
MAP 3.5.3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HUMBOLDT
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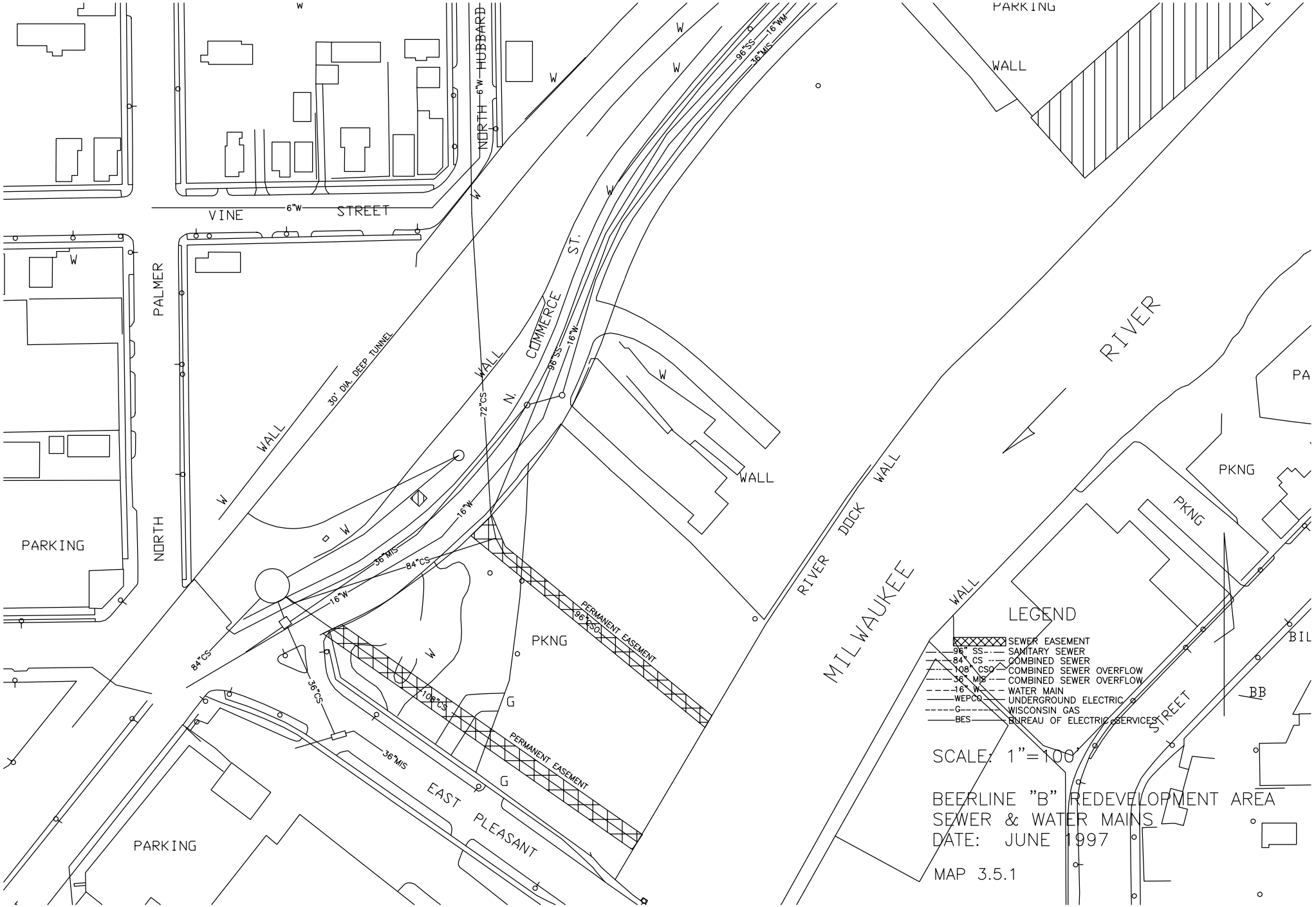
MAP 3.5.4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VINE 6"W STREET
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72"CS
N. COMMERCE ST.
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96"SS 16"WM
36"MIS
16"W
84"CS
36"MIS
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SEWER & WATER MAINS
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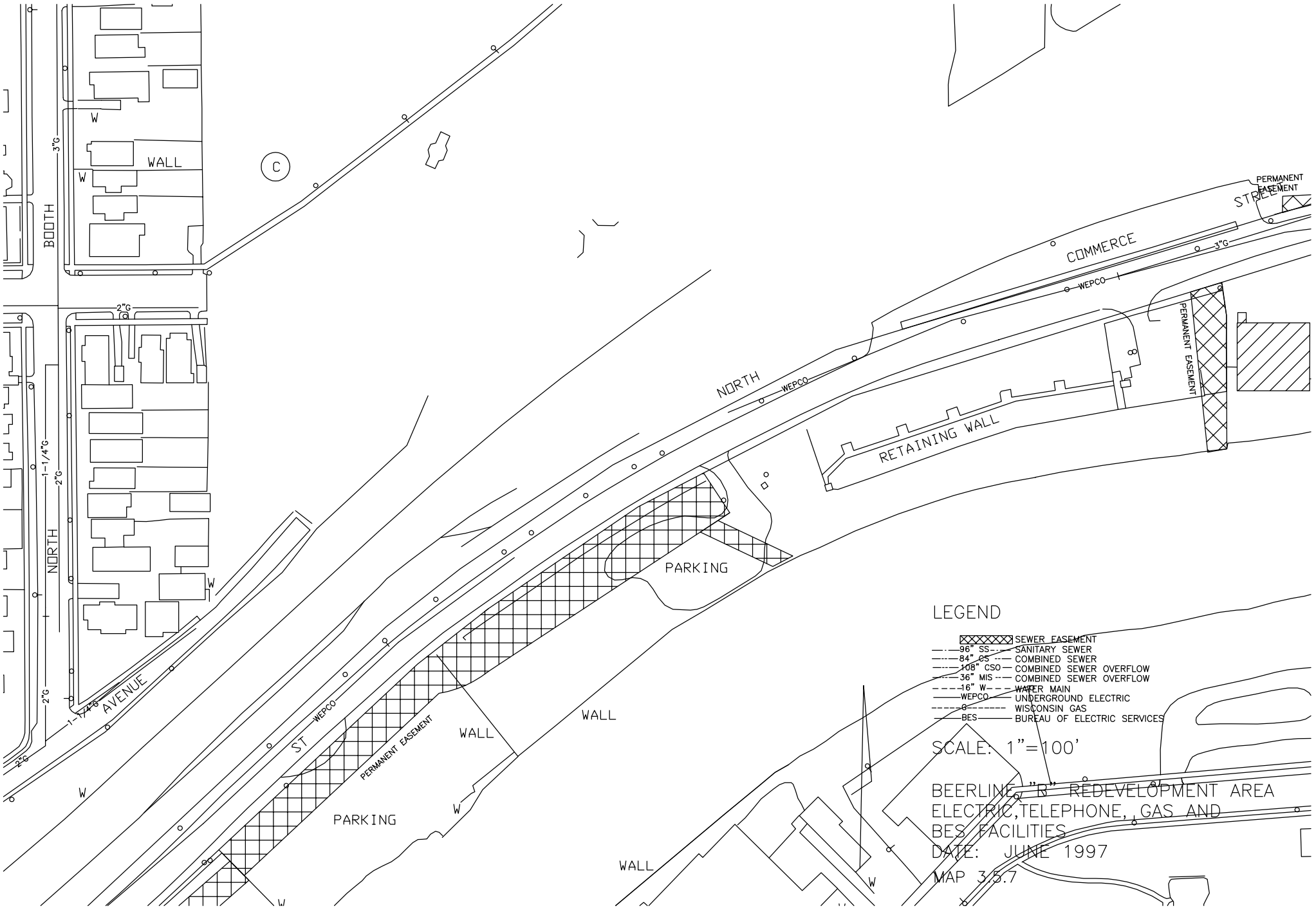
MAP 3.5.1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SCALE: 1"=100'
BEERLINE "B" REDEVELOPMENT AREA
ELECTRIC, TELEPHONE, GAS AND
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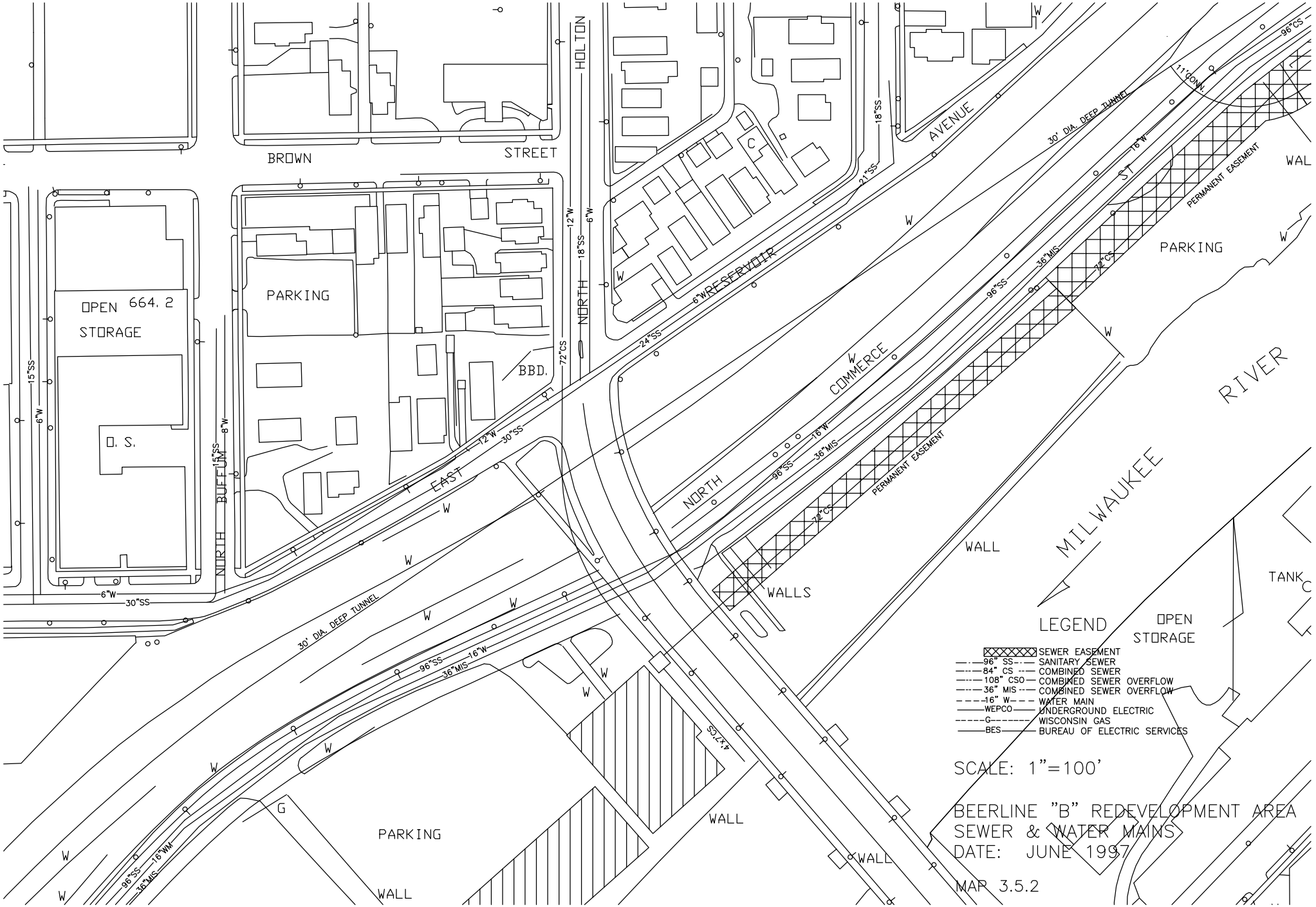
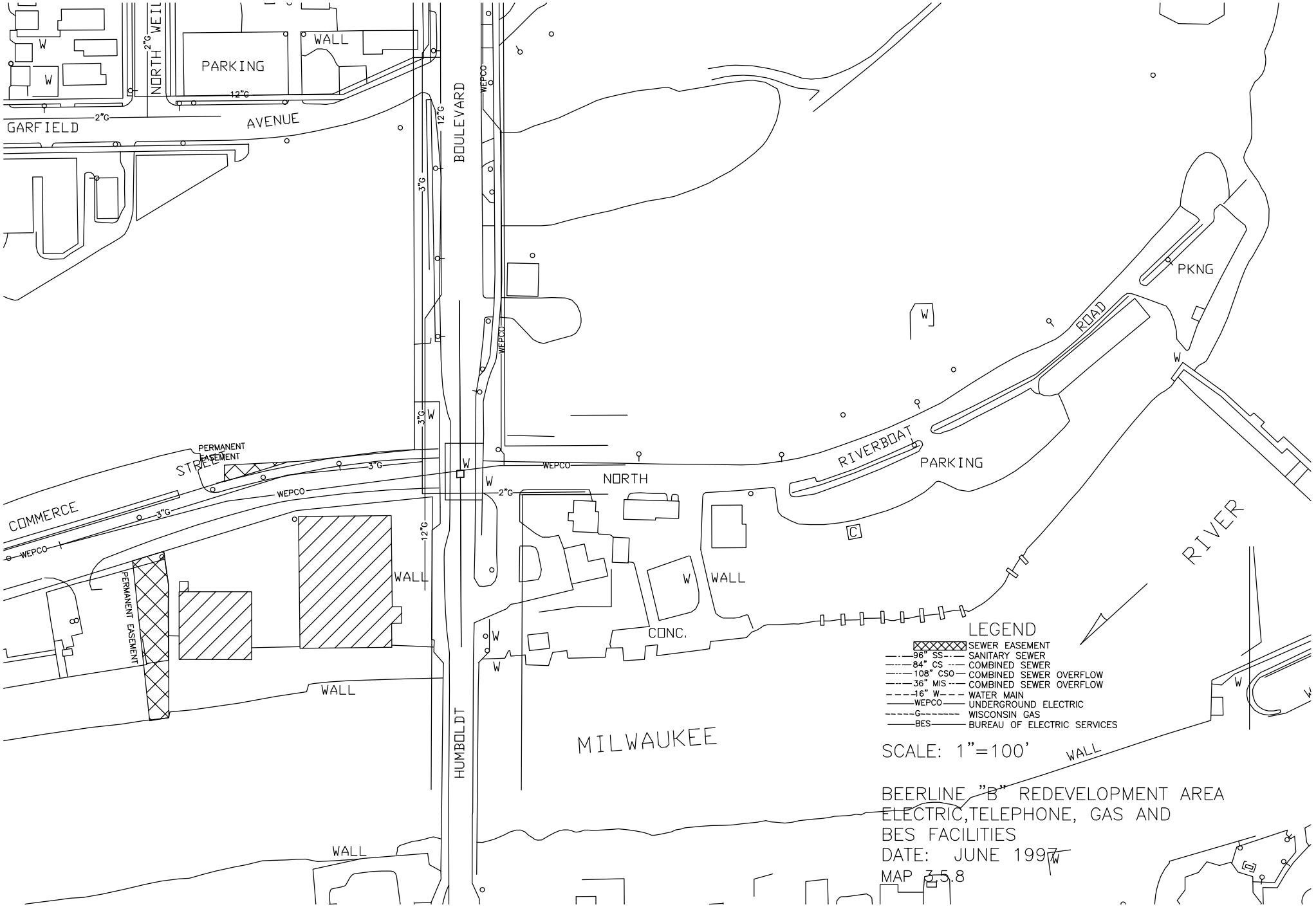
DATE: JUNE 1997
MAP 3.5.7


BROWN STREET
HOLTON
NORTH AVENUE
30" DIA. DEEP TUNNEL
11'DIA.
96"CS
16"W
PERMANENT EASEMENT
WAL
PARKING
OPEN STORAGE
664.2
O. S.
PARKING
BBD.
72"CS
NORTH BUFFUM
15"SS
8"W
6"W
12"W
18"SS
6"W
21"SS
6"W RESERVOIR
24"SS
W COMMERCE
96"SS
36"MIS
72"CS
EAST
12"W
30"SS
NORTH
16"W
36"MIS
96"SS
PERMANENT EASEMENT
72"CS
RIVER
MILWAUKEE
WALL
WALLS
TANK
6"W
30"SS
30" DIA. DEEP TUNNEL
96"SS
16"W
36"MIS
4"X12"GS
G
PARKING
WALL
WALL
WALL
96"SS
16"WM
36"MIS
LEGEND
OPEN STORAGE
SEWER EASEMENT
96" SS SANITARY SEWER
84" CS COMBINED SEWER
108" CSO COMBINED SEWER OVERFLOW
36" MIS COMBINED SEWER OVERFLOW
16" W WATER MAIN
WEPCO UNDERGROUND ELECTRIC
G WISCONSIN GAS
BES BUREAU OF ELECTRIC SERVICES
SCALE: 1"=100'
BEERLINE "B" REDEVELOPMENT AREA
SEWER & WATER MAINS
DATE: JUNE 1997
MAP 3.5.2


GARFIELD AVENUE
NORTH
PARKING
WALL
BOULEVARD
WEPCO
12"G
3"G
2"G
PKNG
ROAD
RIVERBOAT
PARKING
NORTH
PERMANENT EASEMENT
STREET
COMMERCE
WALL
CONC.
RIVER
HUMBOLDT
MILWAUKEE
LEGEND
SEWER EASEMENT
96" SS SANITARY SEWER
84" CS COMBINED SEWER
108" CSO COMBINED SEWER OVERFLOW
36" MIS COMBINED SEWER OVERFLOW
16" W WATER MAIN
WEPCO UNDERGROUND ELECTRIC
G WISCONSIN GAS
BES BUREAU OF ELECTRIC SERVICES
SCALE: 1"=100'
BEERLINE "B" REDEVELOPMENT AREA
ELECTRIC,TELEPHONE, GAS AND
BES FACILITIES
DATE: JUNE 1997
MAP 35.8

Chapter 4 • Master Plan & Planning Principles

4.1 Master Plan

The intention of this project is to create a new neighborhood that integrates into the adjacent urban fabric of Brewer's Hill and at the same time provides new places to live and work near downtown on the spectacular waterfront of the Milwaukee River.

4.1.1 Urban Pattern

Precedents

Brewer's Hill is a traditional neighborhood laid out on a grid of streets and blocks oriented in a north-south direction and part of the continuous urban grid of Milwaukee. It has a strong pattern of housing in the form of two-story duplex units on 35-foot wide lots facing the streets. Mid-block unpaved 20-foot wide service alleys provide access to garages and on occasion to secondary units. The average density is 15-18 dwelling units per acre. The integrated neighborhood has a mix of incomes and life styles as well as a variety of building types. There are numerous retail and commercial parcels often located on corner lots within the residential fabric.

Street and Block Layout

The proposed plan is organized around a series of blocks arranged between streets and pedestrian pathways that connect into the surrounding neighborhood. The block layout acknowledges the existing pattern of site ownership, utility access, and certain site constraints as illustrated in Figure 4.1.1.

Neighborhood Fabric

The aim of the plan is to make a new neighborhood that is traditional in character and integrated into the adjacent urban fabric. It is not intended to be a segregated "gated" community which turns its back on the surrounding area. The urban pattern of streets and blocks will permit a mix of uses and building types. This flexible pattern is responsive to changing market conditions and a diverse range of market sectors as well as making the neighborhood feel and look more like a traditional neighborhood.

4.1.2 Linkages & Open Space

The quality of a street should enhance not only the experience of using the street as a link between places, but should also serve to create another memorable public open space and a place for neighborhood interaction. Streets and pedestrian paths are open spaces as well as linkages. Conversely, what we usually recognize as open space, parks and squares, also act as linkages by connecting the neighborhood fabric around them.

New public open spaces and linkages, in the form of landscaped vehicular and pedestrian streets, parks and squares are proposed as part of the Master Plan. Additions and extensions to the existing system of public open space are also proposed, including linkages to Kilbourn Park and the Brewer's Hill neighborhood, as well as the creation of a major addition to the Riverwalk. The types of existing and proposed open space in the study area are described below.

Site Access

Currently access to the site is restricted to the two points where Commerce Street joins the existing street grid. At the south, Commerce Street connects with Pleasant Street at a five-way intersection with Palmer Street. At the north end of the site, Commerce Street joins Humboldt Avenue via a low underpass and a connector street to the Humboldt Avenue bridge.

The Pleasant Street intersection is improved as part of an improvements project for Commerce Street to accommodate the Brewer's Point Apartments as far as the Holton Street viaduct. The street right-of-way is widened and realigned to improve the appearance of the Pleasant Street intersection.

At Humboldt Avenue, it is recommended that Commerce Street be realigned approximately 150 feet to the north so as to create a new intersection and roadway extension eastward through the Humboldt Yards to North Avenue as illustrated in Figure 4.1.2. The existing street with its limited 11-foot headroom would be retained as a minor access to service the two existing commercial buildings on Commerce Street next to the Humboldt Avenue bridge. The new road would ascend the bluff at a grade no steeper than 8%, a typical maximum for streets in this region.

Vehicular Streets

Vehicular streets fall into two main categories:

- **Major Circulation Streets** Commerce Street is the only major circulation street. It is distinguished from other streets by a posted 25 miles per hour speed limit and a 36-foot curb-to-curb dimension.

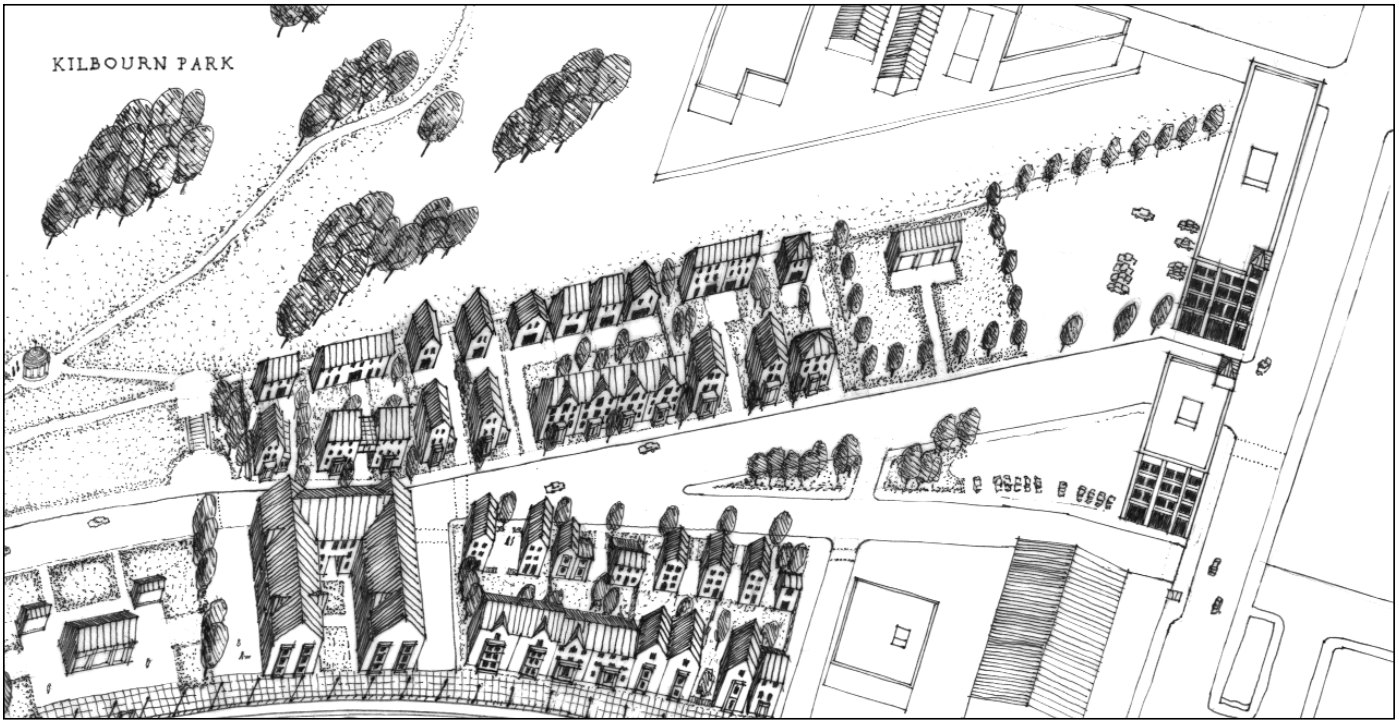


Figure 4.1.2

Commerce Street supports two-way traffic with parallel parking on both sides, which in turn promotes traffic calming.

- **Minor Circulation Streets** All streets, except Commerce Street are minor circulation streets. These streets differ from the other streets by a posted 15 mph speed limit and a 36-foot curb-to-curb dimension. Minor circulation streets are two-way with parallel parking on one or both sides. Two different conditions are illustrated in Figures 4.1.3 and 4.1.4. One condition shows development on both sides of the street, while the second shows development around the square.

The Riverwalk

The plan proposes to continue the Riverwalk which currently extends from downtown as far as the Pleasant Street bridge along the length of the site to Humboldt Avenue (Figure 4.1.5). This will provide a fully accessible, continuous pedestrian and bicycle path. A series of connectors (Figure 4.1.3) will link the Riverwalk to Commerce Street and the Brewer's Hill street grid. These connectors also provide a visual link to the river and permit public access to the water. The creation of an attractive Riverwalk is a key component of this project, as envisioned in the 1992 Milwaukee Riverlink Guidelines. Along the length of the project area, a number of riverwalk conditions could be encountered. Typical conditions include Rock Revetment (Figure 4.1.6.), Rock Revetment with Access (Figure 4.1.7.), Vertical Structural Edge (Figure 4.1.8.), and Vertical Structural Edge with Access (Figure 4.1.9.).

Steps to Link the Existing Streets to the New Development

An important aspect of the intention of integrating the new neighborhood into Brewer's Hill is to provide multiple linkages for access. Seven new points of access (Figure 4.1.1) are proposed in the form of steps or ramps from the top of the bluff to the new neighborhood below. These grand terraced steps and ramps are attractively designed to promote use, as well as to provide opportunities for quiet contemplation (Figure 4.1.10).

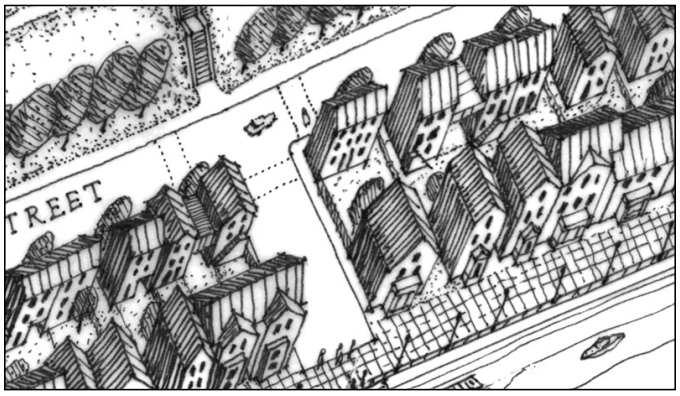


Figure 4.1.3

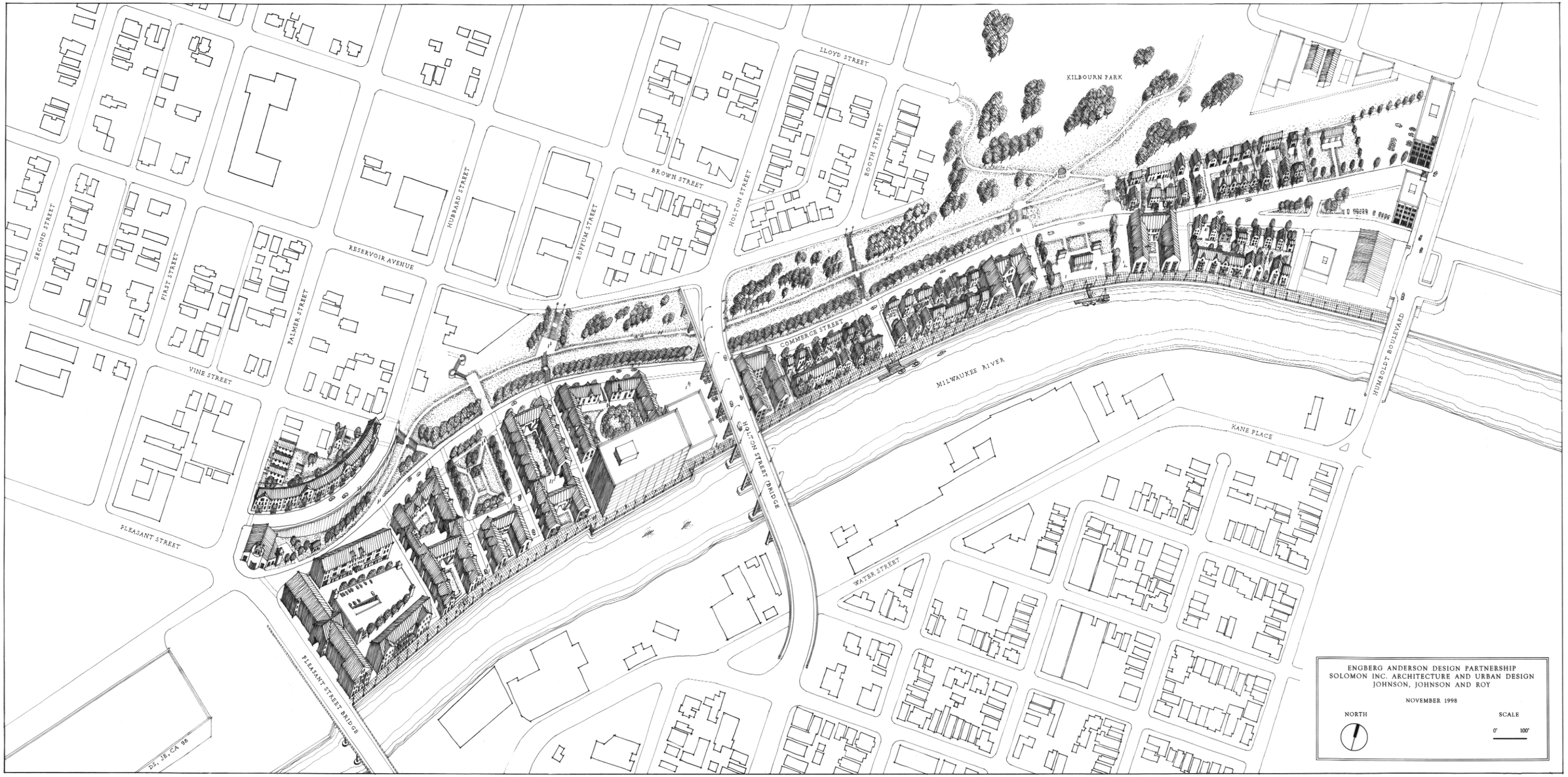


Figure 4.1.1 • Three-Dimensional Site Drawing

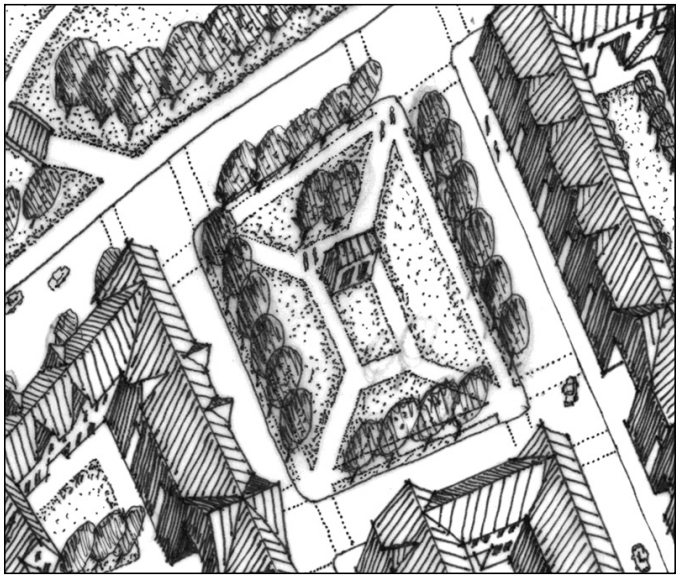


Figure 4.1.4

Where Vine Street and Hubbard Street meet there is at present a 30-foot high retaining wall separating the existing residential neighborhood from the former railroad right-of-way. It is proposed that new public steps and ramps be built at this point to connect the new and existing neighborhoods.

In addition, new steps would be provided at the intersection of Buffum Street and Reservoir Avenue and also at a point half way along Hubbard Street between Vine and Reservoir. The new connections are important for the successful integration of the two neighborhoods as well as helping the economic revitalization of Brewer's Hill.

Vertical Access to the Riverfront at Holton Street
The existing steps from the Holton Street Viaduct to Commerce Street are proposed to be supplemented with a new elevator on the side of the bridge. This will improve pedestrian access from Brewer's Hill to the waterfront as well as provide compliance with the Americans with Disability Act (ADA).

Beer Line Incline
Every project looks for something "special" that sets it apart from everything else. Typically, this element aids in creating a special sense of place and attracts people because of its uniqueness. The Beer Line Incline, or inclined railroad, similar to those inclines found on the steep bluff conditions around Pittsburgh, Pennsylvania and Dubuque, Iowa is proposed for this project to run from Brown Street to the micro-brewery and Riverwalk.

Bicycle Path on the Former Railroad Grade
Similar to other locations in Milwaukee, it is proposed to build a bicycle path on the alignment of the former railroad grade linking Pleasant Street with Humboldt Street. This trail will interconnect with Kilbourn park and provide an naturally landscaped path for cyclists and hikers (Figure 4.1.11).

Milwaukee River
The Milwaukee River is arguably the most prominent linkage and open space at the Beer Line "B" site. It is scenic, a recreational facility, and a transportation link. Traffic on this portion of the Milwaukee River will be primarily limited to traffic from downtown (due to low water conditions upstream of the former North Avenue

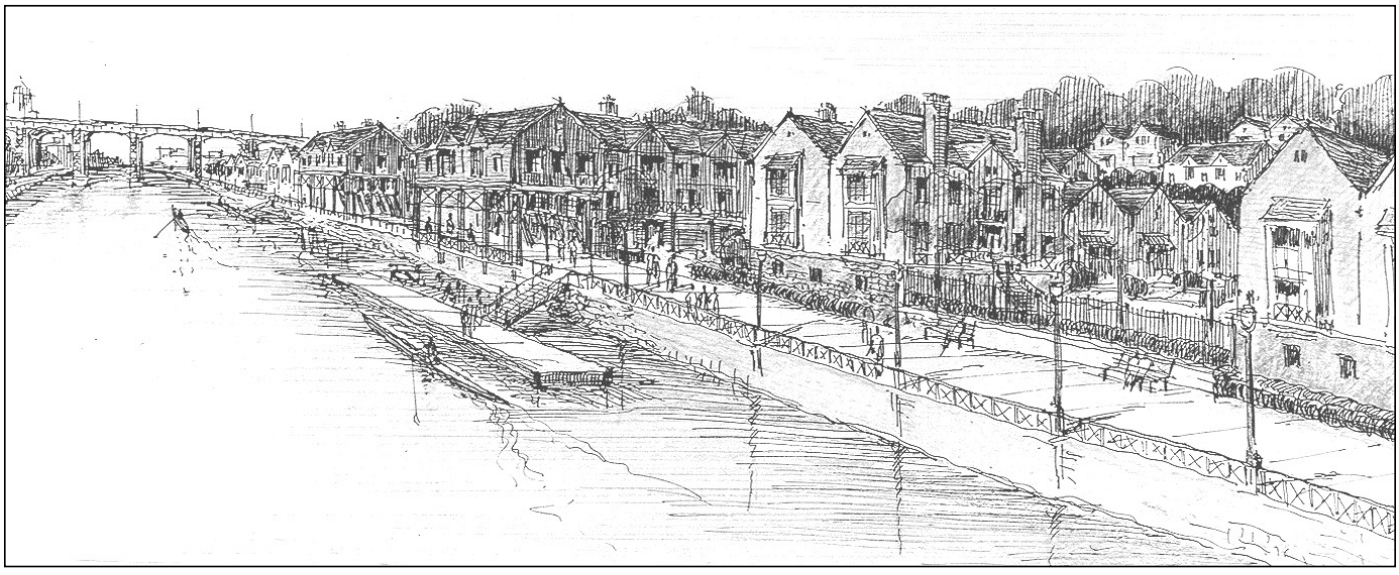


Figure 4.1.5 • View of Riverwalk looking towards Holton Street Bridge

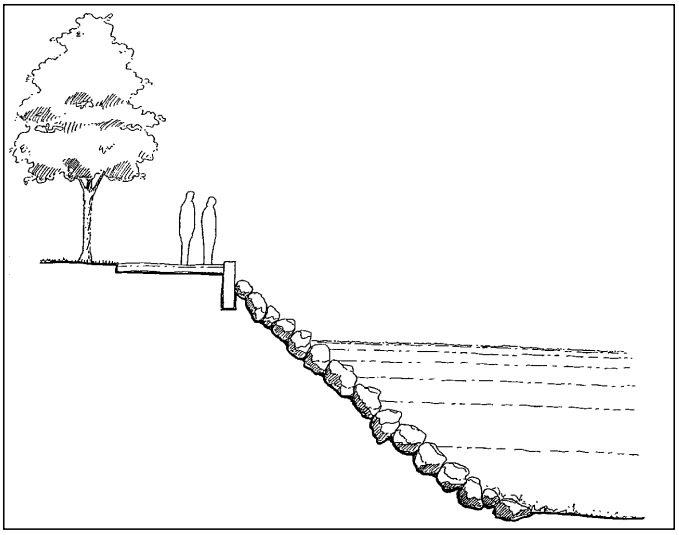


Figure 4.1.6

Dam). With the possibility of water taxi service to the residential and commercial development as one source of traffic, another source may be residents with boat slips at limited locations along the Beer Line "B" site.

One of the current uses of the river which needs to be preserved is the river traffic associated with the Milwaukee Rowing Club. To maintain this vibrant use of the river, the number of finger piers should be limited, as should the length (20' maximum). To further encourage recreational use of the river as linkage, public small craft access points will be established at several points along the Beer Line "B" riverfront. Each riverside development parcel is suggested to engage the river amenity visually and, preferably, physically.

The Residential Square

A new residential square is proposed for the former Trostel Tannery Site next to Commerce Street. Owing to certain limitations for excavation and development, there are restrictions on where construction can take place (Figure 4.1.12). These limitations have been turned into an asset through the proposed creation of a new residential square. This square, 120 feet by 180 feet in area and bounded on all four sides by streets, is similar in scale to the residential square (200 feet by 240 feet) within the Park East project located on Lyon Street between Cass and Marshall Streets. It is intended to receive a combination of hard and soft surface landscape treatment, and with a formal treatment of paths and plantings. Development of a small café and possible public restroom facilities should be encouraged (Figure 4.1.4).

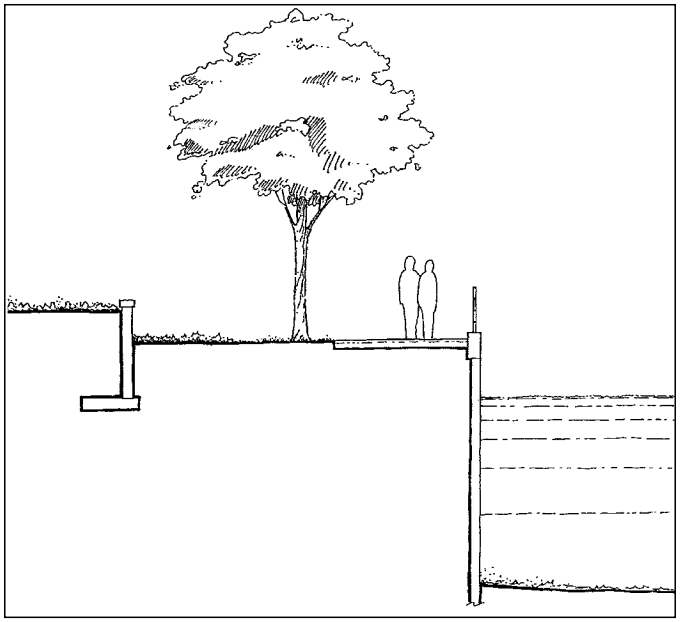


Figure 4.1.8

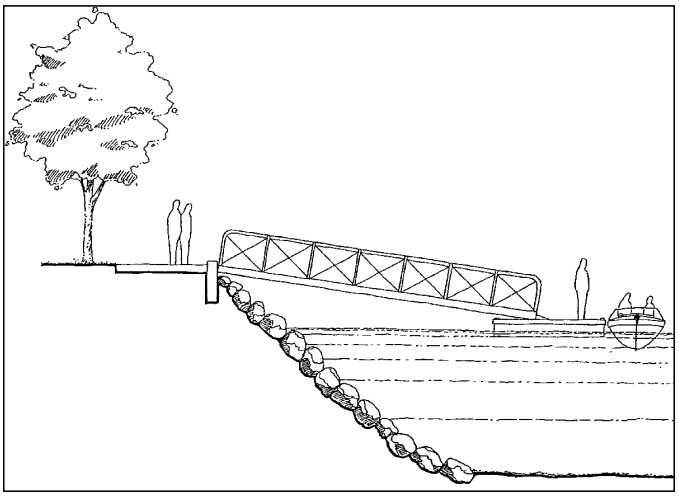


Figure 4.1.7

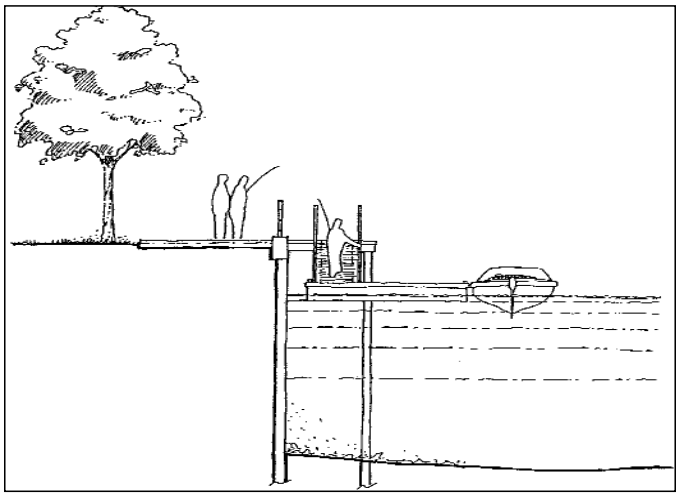


Figure 4.1.9

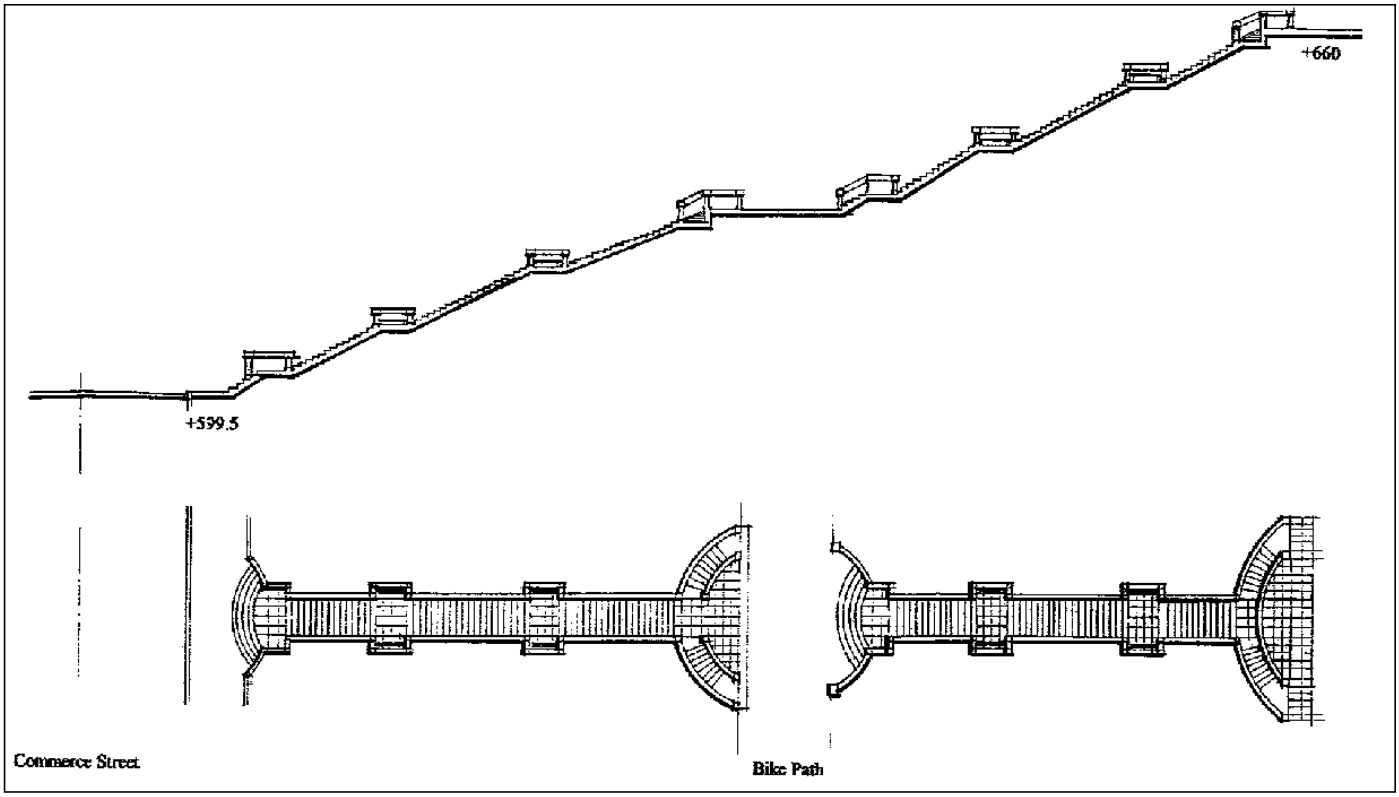


Figure 4.1.10

The Bluff

Additional open space is identified along the steep bluff where, at this time, development may not be economically or physically warranted. The bluff, if undeveloped, is intended to receive planting in a picturesque manner, to maintain its scenic qualities as well as physically maintaining the slope from erosion. It is recommended that non-native invasive trees and shrubs be replaced with native species. If future development is warranted, it is intended that the character of the bluff as naturalistic and scenic landscape reasonably be maintained within the parameters of development.

Kilbourn Park Extension to the River

It is proposed that a panhandle shaped extension from Kilbourn Park on the top of the bluff down the slope to the Riverwalk be created (Figure 4.1.11). This approximately 300-foot wide extension will provide access for the public to the water as well as link the new neighborhood to the park above. Steps and ramps are needed to provide access between the two levels.

4.1.3 Development Parcels

This subsection identifies specific parcels and the opportunities and character for each.

Pleasant Street Gateway

The buildings on this site are proposed to provide the opportunity for a mixed-use development on the parcel of land bounded by Pleasant Street, the river, Commerce Street and the Trostel Property. This site is ideally suited for a mixed-use commercial, retail or entertainment development because of its high visibility from both sides of the river and its location on Pleasant Street. It is proposed that any development should be built to the right-of-way of Pleasant Street, Commerce Street, and the Riverwalk. For commercial development, a parking ratio of 3 cars per 1,000 square feet of development is recommended. Consequently, a parking area in the center of site has been provided. This site has sufficient area for one level of parking to accommodate one floor of commercial space around it. Thus, if a two-story commercial development were to be built, it would require two levels of parking, and three levels for three floors of development, etc.

It is intended that the two parcels on either side of the Commerce Street entry to the site from the south be

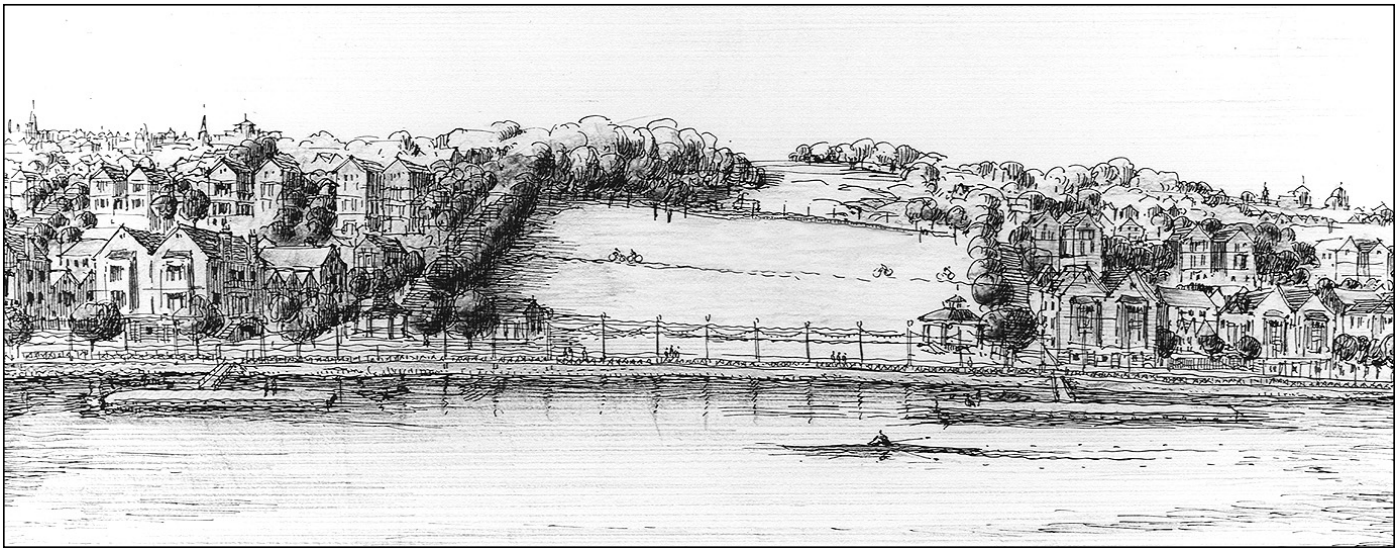


Figure 4.1.11 • View of proposed extension of Kilbourn Park down to the Riverwalk

designed in such a way that they read as "gateway buildings". This implies that they should be designed to balance each other in height, scale, materials and detail (Figure 4.1.13).

If mixed-use pattern is preferred when development is imminent, the parcels facing Commerce Street and the Riverwalk could be built to accommodate housing with retail below. Alternatively, each building could be designed to accommodate a mix of uses organized vertically with two levels of housing over commercial or retail at ground level.

The Hubbard Street Promontory

The need to allow access to the Deep Tunnel Sewer and the desire to complete the existing block bounded by Palmer Street, Vine Street, and Commerce Street has been resolved by the Hubbard Street extension and promontory. The Promontory would be lined with a row of three-story residential buildings with integral garages beneath. The eastern end of the Promontory would connect to Palmer Street. The continuous vertical facades of the building combined with the retaining wall below for the street extension will produce a coordinated visual image unique to Milwaukee (Figure 4.1.14).

Residential Development of the Trostel Site

It is proposed that the Trostel site be developed as a higher density residential neighborhood with three-story walk-up housing apartments or condominiums over congregate parking. The eight parcels surrounding the square are to be developed as a consistent neighborhood with buildings defining the street walls to create an urban room Figure 4.1.4).

Additional Development of the Brewer's Point Site

The existing Brewer's Point development has converted the former industrial buildings into apartments.

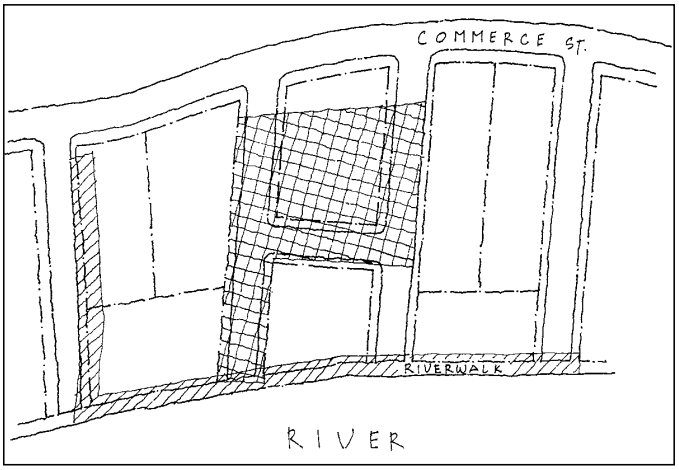


Figure 4.1.12

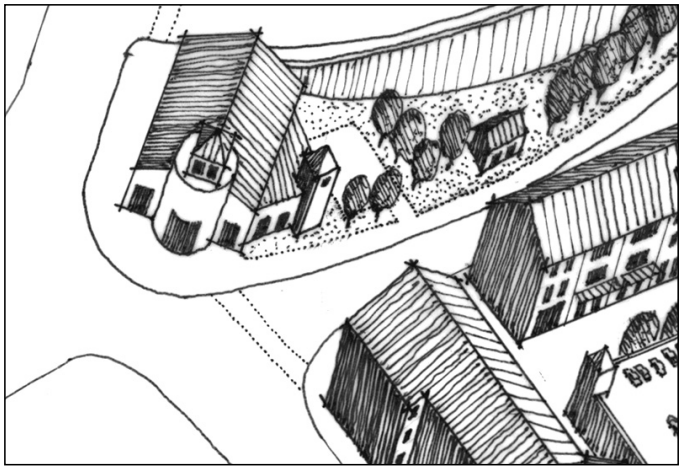


Figure 4.1.13

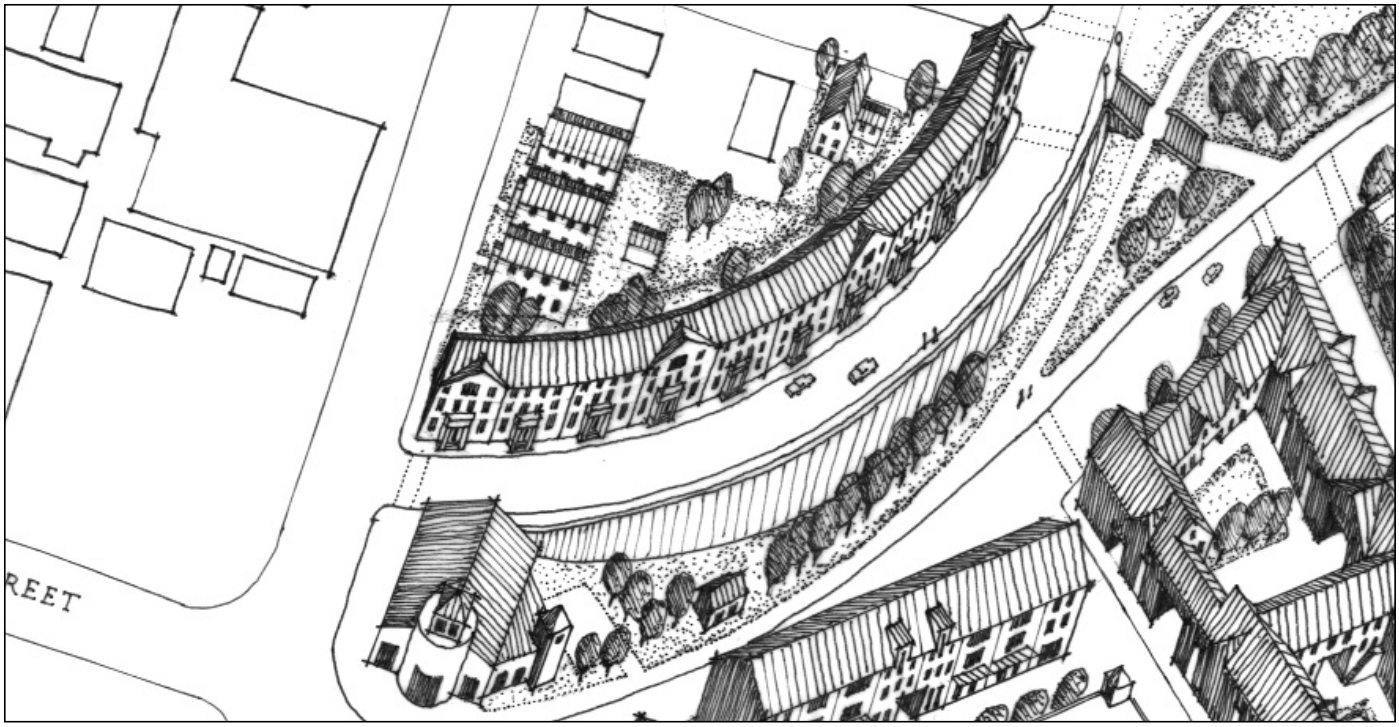


Figure 4.1.14

However, the portion of the site facing Commerce Street has been left open as a parking lot. It is proposed that a parking deck be constructed on the site of the lot, and that a row of lowrise townhouses or apartments over garage parking be built along the edges of the site to define the streetwall and maintain continuity of the new urban fabric. Access to the below grade parking could be via a ramp from Commerce Street (Figure 4.1.15).

Riverside Housing North of Holton Street

The flat land site between Commerce Street and the Riverwalk varies and can accommodate a band of housing oriented both to the street and the water. Various alternate configurations can be used to respond both to market conditions as well as different densities (Figure 4.1.16).

Humboldt Avenue Gateway

The plan proposes that two buildings be built on either side of the new alignment for Commerce Street where it meets Humboldt Avenue. These two sites can accommodate mixed-use buildings with surface parking at the rear. They should be built to the streetwall to define the edge of the site as well as provide continuity of the urban fabric along Humboldt Avenue (Figure 4.1.2).

4.2 Alternative Land Use

The development program for the project area was based on providing an economically feasible mixed-use urban community. The program focused on two primary uses: housing and commercial/mixed-use. The resulting Land Use Plan creatively integrates multiple housing types and commercial/mixed-use with extensive open space, amenities and linkages to adjacent neighborhoods and parks.

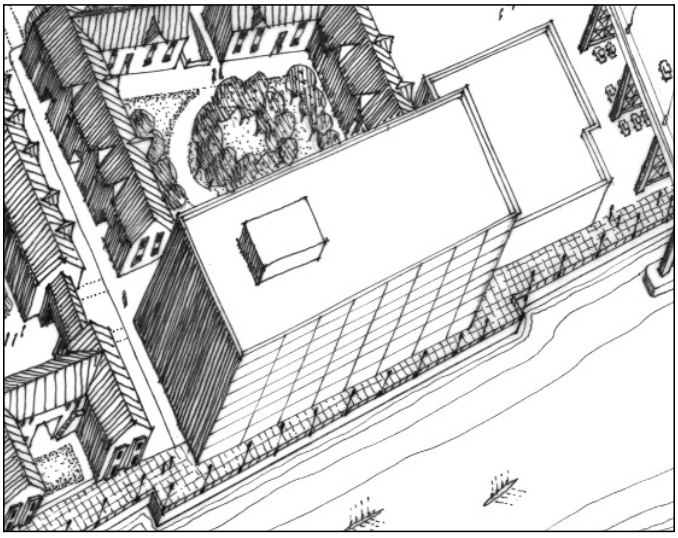


Figure 4.1.15

Figure 4.1.16

The development of commercial uses will be heavily market-driven. Although well positioned for internal and external visibility, if the market will not support the proposed commercial activities on the east and west end of the project area, those land areas are then intended to accommodate additional housing.

4.3 Density

To encourage the creation of a vital mixed-income community, the Land Use Plan provides for a diversity of housing types, including single-family homes, townhouses, condominiums and apartments. As a result, density varies from 12 - 15 dwelling units per acre for single family homes and townhouses, up to 40 dwelling units per acre for multi-family residential. Figure 4.1.1 illustrates the proposed residential densities.

4.4 Proposed Foundation/Ground Improvement Alternatives

Foundations and costs for the proposed one- to three-story commercial and residential developments will depend on location within the study area and the structures' tolerance for differential settlements. Normally, we anticipate maximum total settlements of 1 to 1.5 inches with differential settlements of approximately one-half the total. Additional development costs may results if less settlement is desired or if ground improvements are needed to achieve normal settlement limits.

The following paragraphs present an overview of general foundation conditions for Zones A, B and C as delineated on Figure 4.4.1 and a discussion of foundation alternatives and relative costs in more detail.

4.4.1 Foundations for Structures Located in Zone A

Generally, the worst foundation support conditions are expected for structures (or portions of structures) to be located in Zone A soils as shown on Figures 6.3.4 and 6.3.5. Zone A soils typically have loose or soft fill material overlying 1 to 6 feet of buried, relatively compressible organic silt and clay (estuarine deposits).

Without ground improvement, these soils will generally be suitable for supporting only very light structures and those with higher settlement tolerance (e.g., one-story timber or steel framed structures with flexible metal or timber skins). More heavily loaded one-story structures, masonry structures and multi-story structures will likely require deep foundations or ground improvement with shallow foundations. Most of the existing or previous structures in this area have deep foundations such as driven piles or drilled shafts.

4.4.2 Foundations for Structures Located in Zone B

Foundation support conditions in Zone B differ from Zone A in that the relatively compressible estuarine

deposits are generally absent and that depths to stronger, less compressible soils are less. However, thick, variable-compressibility fill deposits are often present.

In most portions of Zone B, the poor fill quality results in similar foundation support alternatives as those identified for Zone A. In some portions of Zone B, shallow foundations may be feasible without ground improvement for lightly to moderately loaded commercial and residential structures.

4.4.3 Foundations for Structures Located in Zone C

Foundation support conditions in Zone C are generally better than those in Zone A and B due to stiffer soils. Fill soils exist, but are generally thinner, stronger and/or less compressible than in Zones A and B. Fill deposits are underlain by low compressibility glacial soils.

Shallow foundations are more likely to be feasible in Zone C. Although better soils are generally present, the slopes in Zone C will require use of earth-retaining walls and stepped foundations that are designed to resist variable earth pressures.

4.4.4 Deep Foundations

Deep foundation alternatives in Zone A and B include mini-piles, driven piles, pressure injected drilled piles, and drilled shafts. To support the anticipated loads from the proposed one- to three-story commercial and residential developments, low to moderate capacity (15 to 60 kips) deep foundations should be suitable.

Mini-piles typically have diameters ranging from 4 to 7 inches and design capacities ranging from 15 to 40 kips each depending on diameter, depth and soil strength. They may consist of closed-end pipe that is driven or pushed to a suitable toe bearing depth. They may also consist of helical piers such as Atlas Piers or Chance Piers. Helical piers are screwed into the ground until a minimum torque resistance is achieved. Within soil Zone A, we estimate that mini-piles with 15 to 30 kips design capacities may be achieved at depths ranging from 25 to 40 feet. In both zones, higher capacities up to approximately 50 kips per pile are likely to be achievable at deeper depths if more substantial loads are intended.

Higher design capacities may also be achieved with piles or drilled shafts. We estimate that 10- to 13-inch diameter piles or tapered, fluted piles that are driven to depths ranging from 25 to 50 feet may achieve design capacities ranging from 30 to 60 kips within Zone A and from 40 to 80 kips in Zone B. Similarly sized drilled shafts may achieve approximately 75 percent of these design capacity estimates at similar depths. Treated timber piles with 12- to 14-inch butt diameters and 30- to 50-foot lengths might achieve design capacities ranging from 30 to 60 kips each. Steel "H" piles are also feasible, but would likely require 20 to 30 percent deeper penetration depths to achieve similar design capacity as driven pipe piles.

An important consideration in selecting the type of deep foundation if necessary, will be the likely presence of obstructions such as cobbles, boulders, abandoned foundations and rubble fill. Generally, heavy-walled steel pipe and "H" piles with toe protection and rotary-bit-drilled mini-piles are better able to penetrate through soils with frequent obstructions. Driven light-walled steel pipe and timber piles, helical piers, and auger-drilled shafts are more likely to encounter installation difficulties in soils with frequent obstructions.

4.4.5 Aggregate Piers and Piled Footings

Within Zone B soils and possibly Zone A soils, an alternate to piles and drilled shafts may be aggregate piers, compaction-grout columns or piled footings.

Aggregate piers or Geo-Piers involve auger drilling of 2- to 3-foot diameter shafts to depths of 15 to 25 feet, then backfilling and compacting 12- to 18-inch thick lifts of crushed stone. To be cost-effective, the holes must stay open and free of water long enough to place and compact the aggregate. The piers are typically spaced 6 to 10 feet apart. They typically enable net allowable bearing pressures to be increased by 2 to 5 times the net allowable bearing pressures without piers.

Compaction-grout columns or piled footings involve drilling or driving a deep foundation element through the compressible layers and sufficiently into a bearing layer to achieve a geotechnical factor of safety of approximately 1.0 with the deep foundation element supporting approximately one half of the load. These elements are placed below shallow spread footings

which also support approximately one half of the load. The cost savings over conventional deep foundations is that half as many deep foundation elements are used.

The preceding alternatives act to stiffen the existing soil and allow it to support higher allowable bearing pressures on shallow spread foundations. The method is only feasible if the existing shallow soils have some usable load-carrying capacity and if a stronger, less-compressible bearing stratum exists within 15 to 25 feet below the surface. This criteria is generally met in the Zone B soils but not the Zone A soils.

4.4.6 Dynamic Compaction and Surcharging

Another set of alternatives for foundations in Zones A and B is that of shallow foundations bearing on soils which have been improved by dynamic compaction or surcharging.

Dynamic compaction involves densification of compressible soils by repeatedly impacting it with a heavy, 8- to 20-ton, tamper which is dropped by a crane from heights of 20 to 50 feet. It is performed in grid patterns that are closest in footing areas and wider in slab-on-grade areas. After compaction, the resulting surface craters are leveled and compacted with a vibratory roller. Dynamic compaction is more suitable for densifying granular soils and rubble soils that are above the water table. It is generally not recommended for improving zones of saturated cohesive soils such as organic deposits, silts and clays that are near or below the water table. It is also generally not feasible near (within 100 feet) of existing basements, dockwalls, and underground facilities. We anticipate that dynamic compaction may be feasible for some Zone B soils but not for Zone A soils.

Surcharging involves densification or compression of loose or soft soils by placing a surcharge weight over the building footprint area and the allowing it to remain in-place long enough to consolidate the soil. Typically, soil fill is used for the surcharge. We estimate that surcharge piles that are 7 to 10 feet high and left in-place for 2 to 3 months would allow Zone A and B soils to be sufficiently improved such that shallow spread footings may be designed based on net allowable bearing pressure in the range of 1,000 to 2,000 pounds per square foot (psf). Surcharging is more feasible for cohesive soils such as the organic deposits, silts and clays commonly found in Zone A and Zone B soils. It is less feasible within loose granular or rubble fill soils. In addition, surcharging near the existing dockwalls would require careful analysis of dockwall stability and monitoring to ensure that anticipated lateral movements are acceptable.

4.4.7 Overexcavation and Backfilling

Another alternative for improving foundation conditions within Zone A and B soils is that of excavating to remove the more compressible soils followed by backfilling with materials placed in lifts and compacted with a cementitious flowable fill. This alternative would generally require sloped or braced excavations and groundwater cutoff or dewatering below the water table. In addition, landfilling or treatment of the removed soil and water may be necessary if it is found to be impacted by contaminants. If the relatively compressible fill and organic soils are removed and replaced with material that has been compacted to approximately 95 percent of the materials' maximum dry density as established by testing in accordance with ASTM D1557, Modified Proctor Method, shallow spread foundations bearing on the new fill could likely be designed based on net allowable bearing pressures of 3,000 psf.

4.4.8 Relative Foundation and Ground Improvement Costs

Foundation and earth-retaining costs are anticipated to be greater for development within the Beer Line "B" study area than for relatively flat, good ground sites elsewhere in the Milwaukee area. However, these costs are not anticipated to be significantly different than those for similar developments in the lower Milwaukee and Menomonee River valleys. Many variables will influence the ultimate development costs for foundations including type of facility (e.g., basements, loads and settlement sensitivity), the owner's and designer's willingness to accept risk, and the specific subsurface conditions of each parcel. Generally, higher foundation costs are anticipated in Zone A soils than in Zone B or C soils.

In order to help assess possible foundation costs, unit cost ranges for various alternatives were prepared and are listed in Table 4.4.1. The listed cost estimates are considered order-of-magnitude estimates for foundation costs beyond those typically estimated for shallow foundations supporting typical one- to three-story

residential and commercial buildings at good ground sites in the Milwaukee Metropolitan area. The general need for ground improvement was previously discussed. More specific foundation and ground improvement assessments should be made for individual parcels and proposed developments as design information becomes available.

4.5 Environmental Management

This section provides an overview of the conditions of the Beer Line "B" project area from an environmental regulatory and construction perspective and provides general discussion on how these issues may be addressed during redevelopment.

4.5.1 Site Environmental Conditions Overview

The evaluation of the Beer Line "B" Planning Area was completed by first reviewing existing informational sources concerning environmental conditions and then completing soil and groundwater testing to: 1) provide additional information regarding suspected or known issues, and 2) provide baseline information where no previous information existed. The site evaluations included testing soil and groundwater samples for RCRA metals, polycyclic aromatic hydrocarbons, volatile organic compounds, cyanide, boron and pesticides. The soil and groundwater testing completed was sufficient to provide a broad overview of the site conditions. Additional testing on a parcel-by-parcel basis is advisable prior to purchasing, or constructing on individual parcels.

The area has had a long history of primarily industrial activity dating to the original development of the City of Milwaukee, and consequently there is the potential for numerous environmental issues. These include identified issues and yet undiscovered issues. The identified issues generally fall into the category of low-level contamination associated with fill soil. There were some low-level groundwater contamination issues identified but these were sporadic. A more detailed discussion of the past parcel uses and results of testing performed on individual parcels is found in Section 7.4. Fill-related construction issues are generally manageable during redevelopment and would not typically provide significant obstacles. Further discussion of these considerations is provided below.

4.5.2 Environmental Issue Management

Regulatory Issues

Resolution of the issues identified during this study has become much easier in the past few years due to changes in Wisconsin Department of Natural Resources (WDNR) codes and policies. These changes primarily relate to closure flexibility with the groundwater quality standards; generic soil direct contact and groundwater protection-based standards; and guidance from the WDNR concerning performance-based closure. Redevelopment planning that includes coordination with WDNR from the early stages of the project will assist in reducing delays due to environmental contamination issues.

The issues identified within the planning area predominantly relate to surficial fill soils have contaminant concentrations exceeding NR 720, Wisconsin Administrative Code Generic Residual Contaminant Levels for direct contact with soil and, in some cases, contain non-exempt solid wastes, such as cinders and possibly coal. Significant groundwater impacts were not identified across the BLB project area. Some limited areas of groundwater exceedances of PALs were noted and may require additional investigation, monitoring and/or a groundwater use restriction.

If significant groundwater impacts are not present, a performance-based closure can be considered for affected soils rather than in-situ treatment or removal and disposal. Under a performance-based closure, direct contact issues can be managed by limiting the potential for contact with the fill soil by integrating engineering controls (i.e., direct contact barriers) into the site redevelopment planning and making deed notifications identifying the presence of these materials. Direct contact barriers can include, but are not limited to: soil covers (2 to 3 feet thick), geomembranes, geotextiles, buildings and pavements. It is possible that some contaminated soil may require landfilling, however, the limited available soil and groundwater data and numerous permutations of scenarios make estimating possible costs impossible.

The classification of a site as an abandoned landfill depends on the quantity and distribution of non-exempt fills present on-site. Additional soils information and fill characterization would be required to determine if

any of the parcels would be classified as abandoned landfills under NR500, WAC. This classification would require that "an exemption to construction on an abandoned landfill" be applied for and approved by WDNR prior to construction. These exemptions are not considered significant barriers to redevelopment but add additional cost and time. At this time, WDNR has not granted purchaser protection to purchasers of "abandoned landfill" sites; therefore, these sites pose a perception of a higher risk to a potential purchaser.

Past experience would suggest that one of the most onerous obstacles to overcome is the time required to resolve the issues with the WDNR given typical fast-paced development schedules. Coordination with WDNR from the outset of the development planning of the site will facilitate acceptance of the project by WDNR. An allowance of two to four months for site characterization and negotiations with the WDNR is advisable. Typically, a more detailed program of soil and groundwater testing would be required, followed by submittal to the WDNR of a strategic remedial plan which integrates environmental solutions and redevelopment plans. This integration generally entails specific design details relating to foundation depths; current and future property usage; utilities; pavement areas; building locations; health and safety issues; and affected soil and groundwater management during construction.

Construction Issues

Previously unidentified concerns typically arise during construction. Sufficient exploration preceding the actual site construction activities serves to limit the unexpected issues and also tends to reduce the costs to manage these issues. When these issues are known prior to construction, more creative and less costly material management options are typically available. Issues that arise during construction may result in higher material handling costs (i.e., landfilling of contaminated soil) and possible construction delays. Contingency plans should be part of the development planning process and construction schedule. Also, contingency costs for environmental issues should be included in the development of economic analysis.

Chapter 5 • Neighborhood Code

The Neighborhood Code consists of the following: Regulating Plan, Urban Code, Architectural Code, and Landscape Code. The Neighborhood Code will be administered by the Redevelopment Authority of the City of Milwaukee (RACM) through the DCD staff based upon adherence to this code.

5.1 Regulating Plan

The enclosed Regulating Plan is intended as the master organizational plan for the Beer Line "B" development. Every building lot has been designated for particular building types as identified in the Regulating Plan.

5.2 Urban Code

5.2.1 Introduction

The Urban Code addresses issues of building use, building placement, building heights, fencing, parking and accessory buildings on each building site. Used in conjunction with the Regulating Plan, this code is written to ensure a cohesive urban design for the Beer Line "B" development.

5.2.2 Building and Spatial Hierarchy

This section recognizes and codifies a basic sense of order and hierarchy proposed within the entire built urban context of the Beer Line "B" site. As such, the built form of the buildings and the resultant open spaces; both public and private, which make up this neighborhood must be considered in their totality.

The neighborhood consists of blocks on a network of streets and open spaces. These are laid out to create appropriate building sites and to shorten pedestrian routes. An interconnecting street pattern provides multiple routes, diffusing and slowing automobile traffic while increasing pedestrian activity and encouraging the casual meetings that form the bonds of community.

Public space shall be recognized as the principal space. This includes but is not limited to streets, squares, parks, riverwalks, and pedestrian and bike paths. Private space bordering public space shall be developed and designed to support and contribute to the quality and character of the public space. This includes but is not limited to building porches, balconies and stoops, front yards, backyards, courtyards, walkways, and surface parking areas.

Public spaces and public buildings enhance community identity and helps to foster civic pride. Only by the participation and cooperation of the private sector in the creation of both the public and private space will a successful environment be produced for the benefit of all those who live in Beer Line "B".

It is important to maintain or create a hierarchy that reinforces visual order in the development. In order to define this hierarchy, the different allowable building types as well as the public and private spaces have been categorized. The following building typologies define a variety of potential building combinations while at the same time reinforce the visual coherence and spatial hierarchy of the neighborhood.

5.2.3 Permitted Building Use and Placement

The narratives and diagrams on the following pages illustrate the different uses and placements of the four individual building types.

The Neighborhood Code is a refinement of the zoning codes permitted, special and prohibited uses. In the Beerline "B" Redevelopment Area, the following list describes thoses uses from the zoning code which will be allowed:

Permitted Uses

- Single-family, two-family and multi-family dwellings.
- Community living arrangements for not more than 15 persons, subject to s. 295-14-1 of the Milwaukee Code of Ordinances.
- Elementary and secondary schools.
- Public parks and playgrounds.
- Libraries, art galleries and museums.
- Public police and fire facilities.
- Offices.

Chapter 5 • Neighborhood Code

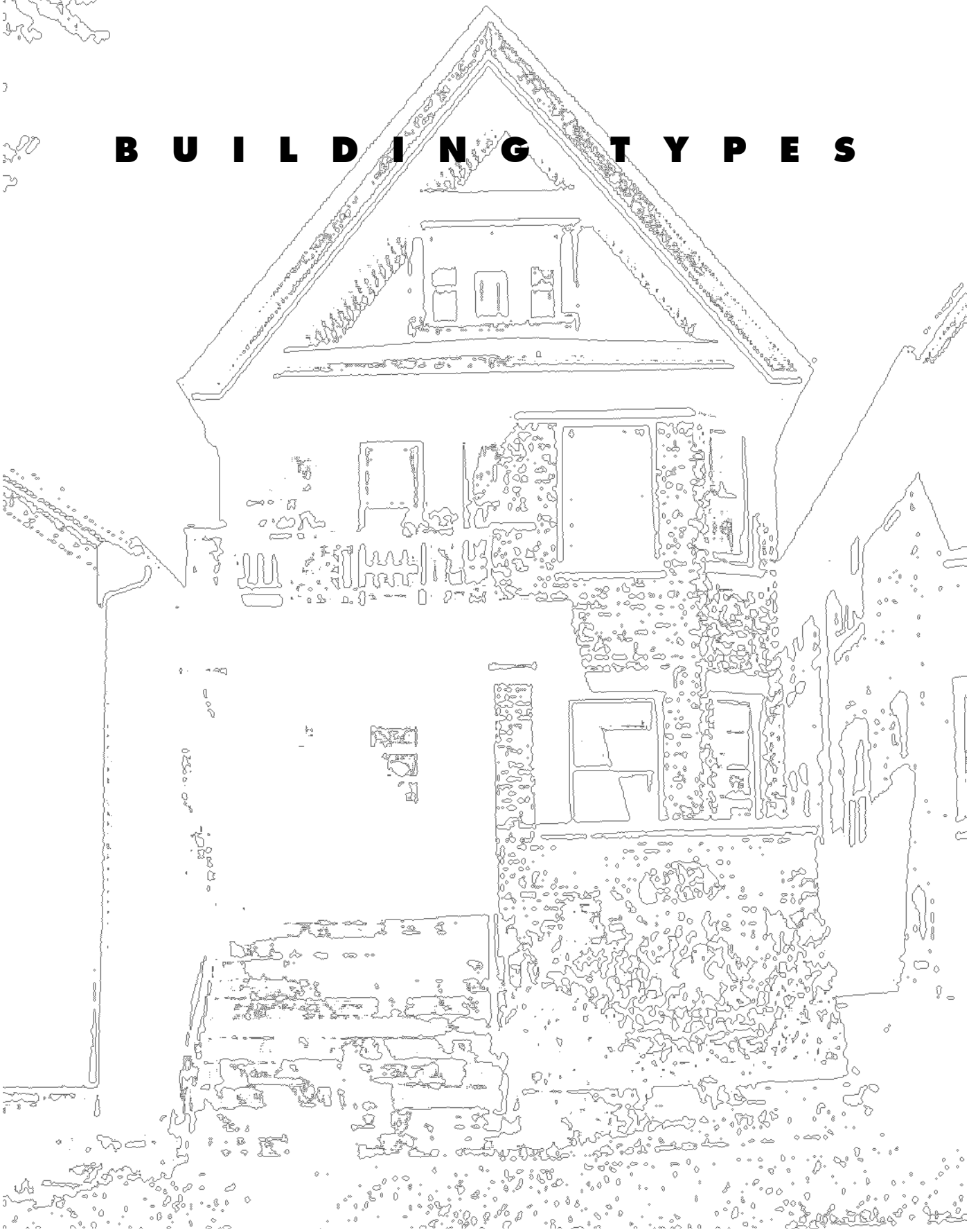
Permitted Uses (continued)

- Banks and other financial institutions.
- Membership organizations.
- General retail establishments not exceeding 15,000 square feet.
- Parking structures if at least 40% of the street frontage of the street level area is devoted to uses permitted by s. 295-422 of the Milwaukee Code of Ordinances subs. 4, 6, 7, 8-a, 9 and 10 or uses approved by the Boards of Zoning Appeals.
- Personal service establishment.
- Business services.
- Dry cleaning and laundry stations.
- Commercial hotels.
- Type "A" restaurants.
- Taverns including those with live entertainment or amusement machine premises.
- Theaters, except outdoor theaters, adult motion picture theaters and adult coin-operated moving picture premises.
- Marinas.
- Production of handicrafts, with no more than 3 employees.
- On premise canopy, hood, marquee, projecting, wall and permanent ground signs.
- Accessory uses exclusive of signs.

Special Uses

- Day care centers.
- Specialty schools.
- Health clinics.
- Consumer services.
- Antique or secondhand stores.
- Parking structures if less than 40% of the street frontage of the street level area is devoted to permitted uses or uses approved by the Board of Zoning Appeals.
- Recreation facilities.
- Manufacturing, fabricating, assembling or industrial processing of products listed in s. 295-472-14-b of the Milwaukee Code of Ordinances and the production of handicrafts using more than 3 employees.
- Live/work buildings subject to s. 295-14-2.5 of the Milwaukee Code of Ordinances.
- That portion of a permitted use which contains, alters or adds a drive-through facility.

BUILDING TYPES



Chapter 5 • Neighborhood Code

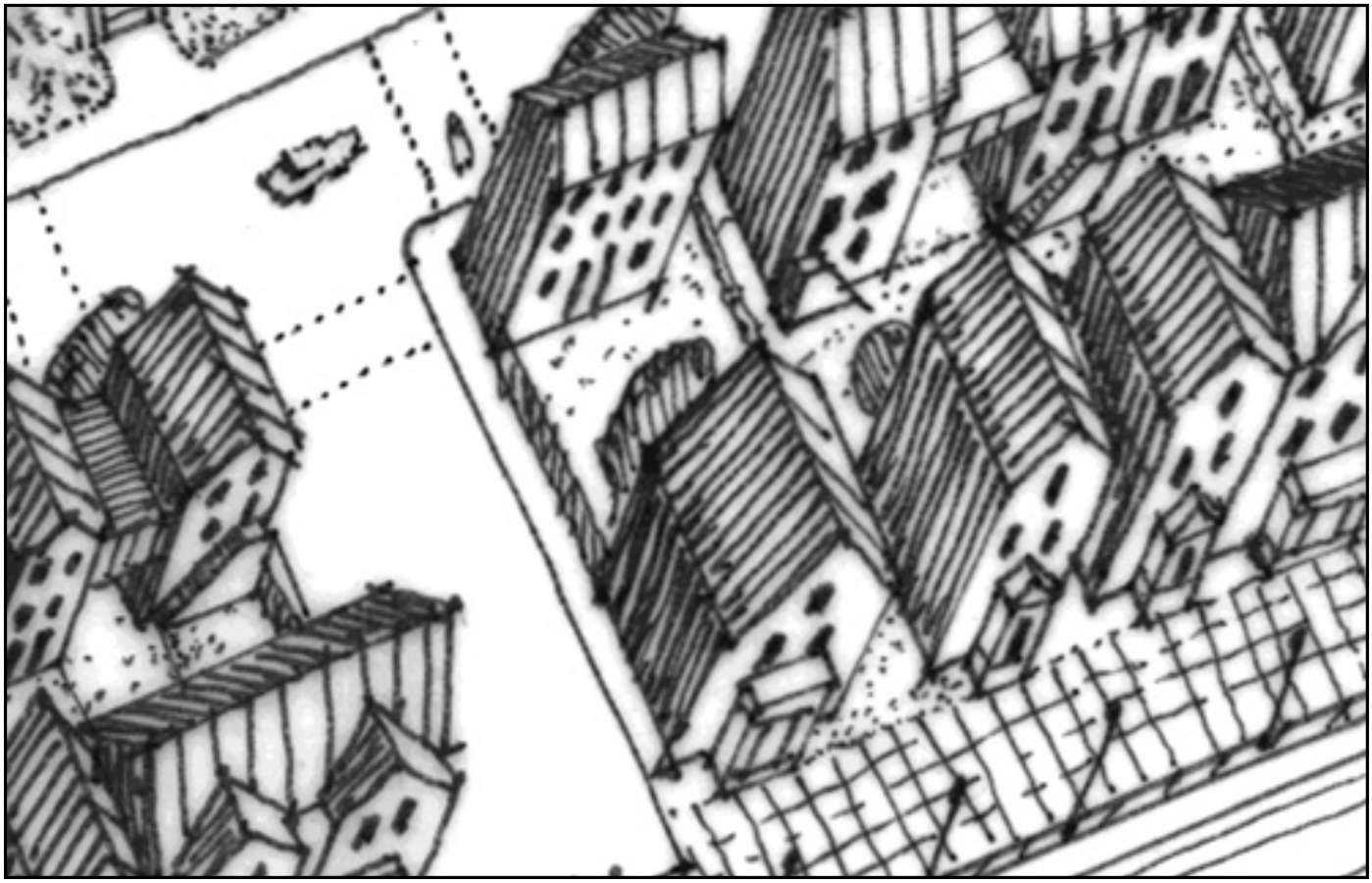
Key of Building Types

Building Type I: Single and Two Family Residences

Building Type II: Single Family Rowhouses

Building Type III: Courtyard Multi-Family Residential Building

Building Type IV: Mixed-Use: Residential/Commercial



Building Type I

SINGLE AND TWO FAMILY RESIDENCES

All building plans will be reviewed by the DCD to confirm compliance with the standards listed below. All building plans shall conform to the Wisconsin Administrative Code and all applicable building codes. DCD shall be responsible for interpreting the Neighborhood Code as well as approving minor variations.

Building Use

1. The permitted location of building uses are as shown on the appropriate Building Use Diagram.

2. The following uses are permitted either within the principal building or as an accessory building: garage, greenhouse, artist studio, guest cottage, office, rental apartment, workshop.

3. The maximum number of accessory buildings on a lot with a principal building is one. All lots abutting the Riverwalk are required to provide an accessory building upon occupancy.

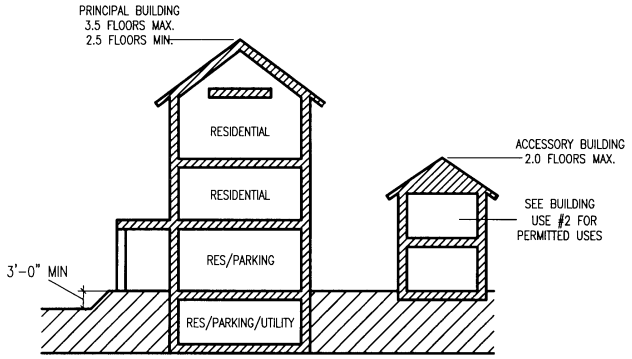
4. The minimum size of an accessory building on Riverwalk lots is 1,000 gross square feet with a maximum enclosed footprint of 500 square feet. Accessory buildings on all other lots shall have a maximum enclosed footprint of 500 square feet.

5. An accessory building is not required on a Riverwalk lot if the principal building is configured to meet the standards of both the principal and accessory building requirements.

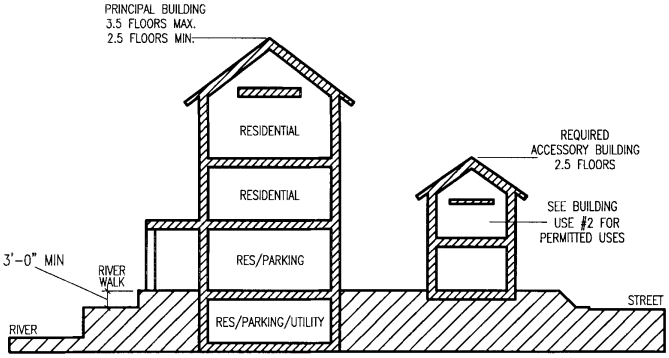
6. Open air structures such as arbors, gazebos and playground equipment are allowed in addition to an accessory building.

7. Trash containers shall be screened from public view by means of fences, walls or other approved enclosures.

8. Basements are allowed in all structures and are not counted as additional gross floor area.



Building Use Diagram



Riverwalk Building Use Diagram

Building Placement

1. Principal buildings and accessory buildings shall be set on lots relative to the property lines as shown on the appropriate Lot Diagram.

2. The total accumulated lot width shall be no less than 30′-0″ and no more than 48′-0″.

3. The front building façade must occupy a minimum of 65% of the lot frontage at the build to line. Building entries must be located on the front building façade. Refer to the Regulating Plan and lot diagrams for the designated front locations.

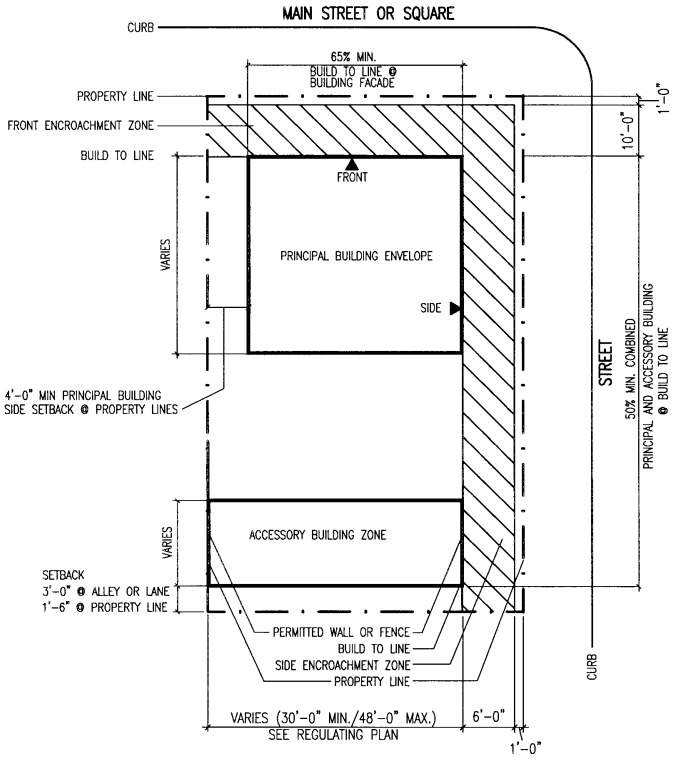
4. Build to lines located on lots with curved property lines at the street (see Regulating Plan) may be substituted with a straight line located at the average depth of the curved line.

5. All lots abutting the Riverwalk are required to provide front building facades facing both the street and the Riverwalk.

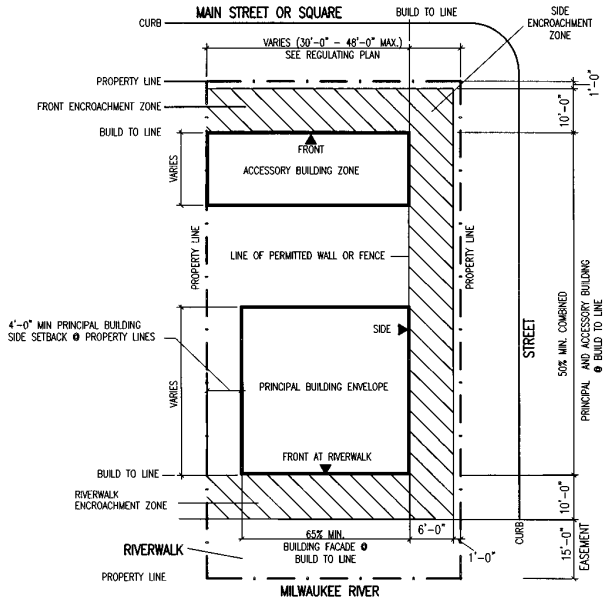
6. Accessory buildings on interior lots shall be grouped together whenever possible at common property lines.

7. For lots at the intersection of two streets or other public spaces, principal buildings shall have the entry walkway and porch accessed from the front of the lot as indicated on the Regulating Plan.

8. For lots at the intersection of two streets or other public spaces, the side of the structure facing the public way which is not designated as 'front' is intended to create a built edge defining the boundary of the other street or public space. To achieve this, the principal building and accessory building adjacent to the other street or public space must occupy a cumulative minimum length of 50% of the sideyard at the build to line.



Lot Diagram



Riverwalk Lot Diagram

Permitted Encroachments Beyond Build To Line and Setback Lines

1. Covered or uncovered open porches, balconies, stoops, bay windows and stairs to the first floor level are permitted within the encroachment zone as shown in the appropriate Lot Diagram.

2. Covered open porches are required on the front of the principal building. The length of the porch is to be no less than 50% of the total length of the front façade with a minimum depth of 6′-0″.

3. Garden walls and/or fences not exceeding 3′-6″ in height shall be permitted within the encroachment zone. Garden walls and/or fences exceeding 3′-6″ feet but not more than 6′-0″ in height shall be permitted on the build to line, a common property line, or within side or rear yards.

4. Eaves may extend up to 4′-0″ into the encroachment zone, and no closer than 1′-0″ from a common property line. In no case may an eave extend beyond the property line or over a utility easement.

Parking

1. Garage doors are not permitted directly on the street or public way façade of a principal or accessory building, except those that face alleys, unless noted otherwise on the Regulating Plan. Covered open portals leading to parking are allowed and encouraged.

2. One driveway curb cut with a maximum of 12′-0″ in width is allowed per building parcel. Shared driveways are permitted and shall have a maximum width of 18′-0″ between the curb line and build to line.

Building Height

1. Minimum and maximum building heights for the principal building shall be measured in number of floors. Minimum height shall be 2 floors and a maximum height of 3.5 floors.

2. A half story indicates a floor level above the eave line which is designed to be habitable.

3. First floor elevation shall be a minimum of 3′-0″ above the adjacent sidewalk elevation. ADA housing units may be an exception.

4. Accessory buildings adjacent to North Commerce Street shall have a required height of 2.5 floors. All other accessory buildings shall be a maximum of 2 floors.

5. Basements are allowed in all structures and not counted as an additional floor.

Building Type II

SINGLE FAMILY ROWHOUSES

All building plans will be reviewed by the DCD to confirm compliance with the standards listed below. All building plans shall conform to the Wisconsin Administrative Code and all applicable building codes. DCD shall be responsible for interpreting the Neighborhood Code as well as approving minor variations.

Building Use

1. The permitted location of building uses are as shown on the Building Use Diagrams.

2. The following uses are permitted either within the principal building or as an accessory building: garage, greenhouse, artist studio, guest cottage, office, rental apartment, workshop.

3. The maximum number of accessory buildings on a lot with a principal building is one. All lots abutting the Riverwalk are required to provide an accessory building upon occupancy.

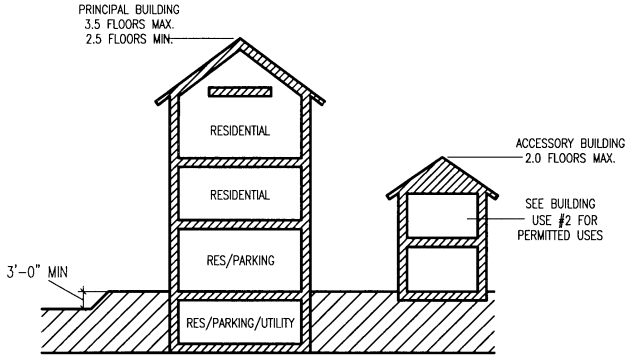
4. The minimum size of an accessory building on Riverwalk lots is 1,000 gross square feet with a maximum enclosed footprint of 500 square feet. Accessory buildings on all other lots shall have a maximum enclosed footprint of 500 square feet.

5. An accessory building is not required on a Riverwalk lot if the principal building is configured to meet the standards of both the principal and accessory building requirements.

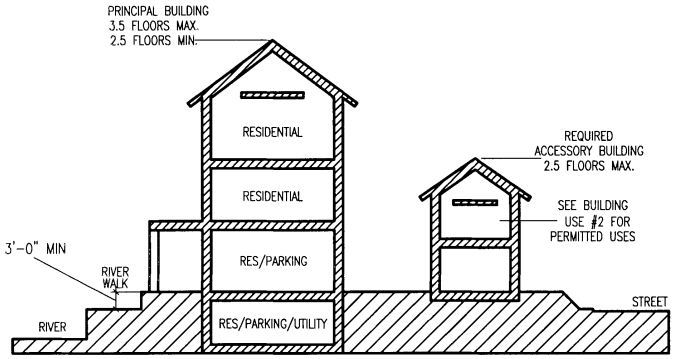
6. Open air structures such as arbors, gazebos and playground equipment are allowed in addition to an accessory building.

7. Trash containers shall be screened from public view by means of fences, walls or other approved enclosures.

8. Basements are allowed in all structures and are not counted as additional gross floor area.



Building Use Diagram



Riverwalk Building Use Diagram

Building Placement

1. Principal buildings and accessory buildings shall be set on lots relative to the property lines as shown on the appropriate Lot Diagram.

2. The total accumulated lot width for individulal units shall be no less than 20′-0″ and no more than 36′-0″. Grouping of Riverwalk lots shall be a minimum width of 60′-0″ with a minimum of two principal buildings and two accessory buildings. If three principal buildings are built on the minimum Riverwalk lot width, one accessory building may be omitted to allow vehicular access to an interior court.

3. The front building façade must occupy a minimum of 80% of the lot frontage at the build to line. The front building facade of accessory buildings shall occupy a minimum of 60% of lot frontage at the build to line. Building entries must be located on the front building façade. Refer to the Regulating Plan and lot diagrams for the designated front locations.

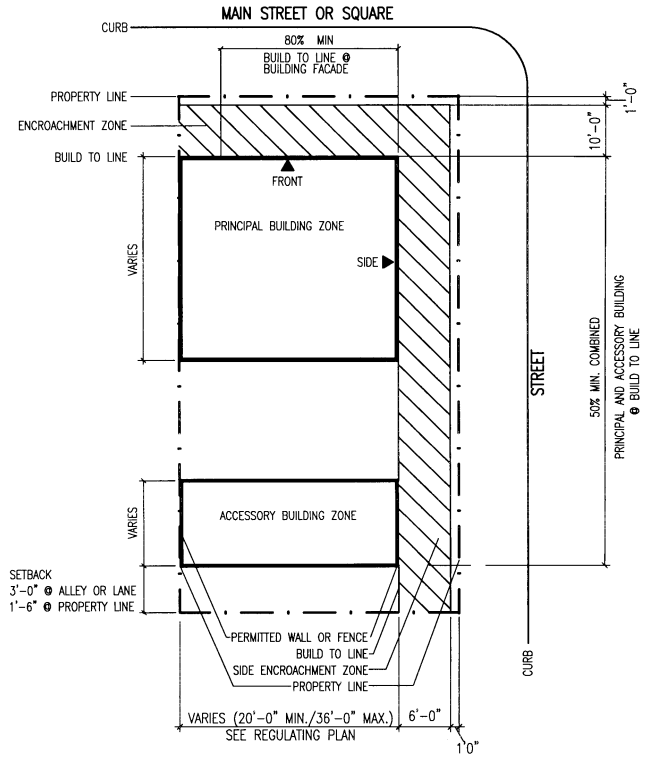
4. Build to lines located on lots with curved property lines at the street (see Regulating Plan) may be substituted with a straight line located at the average depth of the curved line.

5. All lots abutting the Riverwalk are required to provide front building facades facing both the street and the Riverwalk.

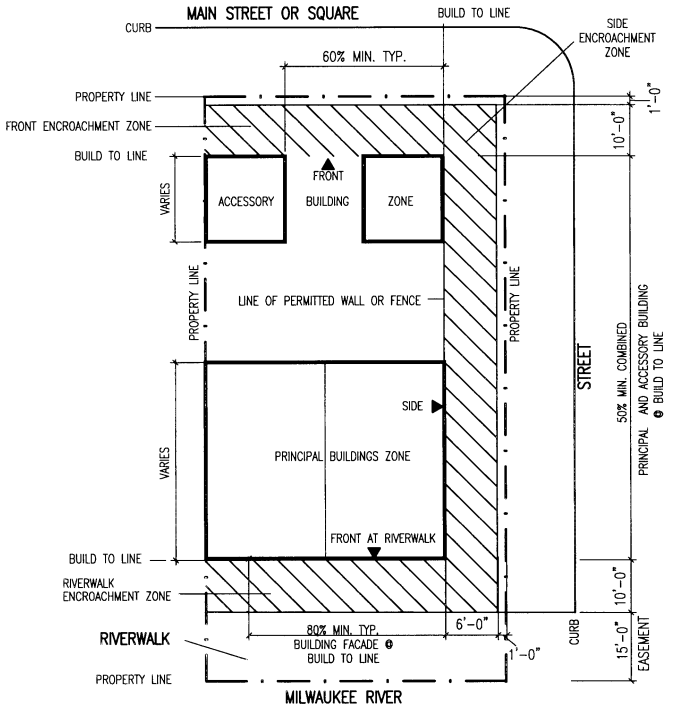
6. Accessory buildings on interior lots shall be grouped together whenever possible at common property lines.

7. For lots at the intersection of two streets or other public spaces, principal buildings shall have the entry walkway and porch accessed from the front of the lot as indicated on the Regulating Plan.

8. For lots at the intersection of two streets or other public spaces, the side of the structure facing the public way which is not designated as 'front' is intended to create a built edge defining the boundary of the other street or public open space. To achieve this, the principal building and accessory building adjacent to the other street or public space must occupy a cumulative minimum length of 50% of the sideyard at the build to line.



Lot Diagram



Riverwalk Lot Diagram

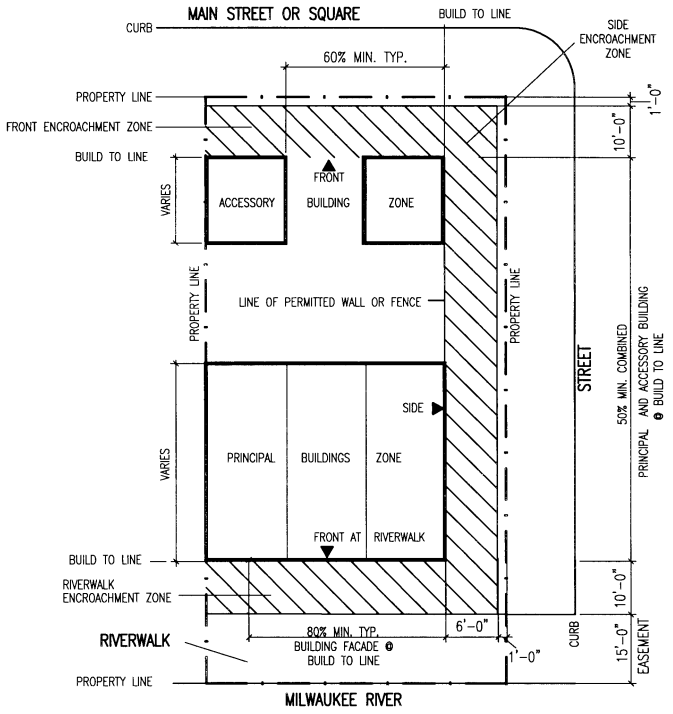
Permitted Encroachments Beyond Build To Line and Setback Lines

1. Covered or uncovered open porches, balconies, stoops, bay windows and stairs to the building's first floor level are permitted within the encroachment zone as shown in the appropriate Lot Diagram.

2. Covered front stoops are required on the front of the principal building if covered porches are not incorporated in the front encroachment zone.

3. Garden walls and/or fences not exceeding 3'-6" in height shall be permitted within the encroachment zone. Garden walls and/or fences exceeding 3'-6" feet but not more than 6'-0" in height shall be permitted on the build to line, a common property line, or within side or rear yards.

4. Eaves may extend up to 4'-0" into the encroachment zone, and no closer than 1'-0" from a common property line. In no case may an eave extend beyond the property line or over a utility easement.



Riverwalk Lot Diagram

Parking

1. Garage doors are not permitted directly on the street or public way façade of a principal or accessory building, except those that face alleys, unless noted otherwise on the Regulating Plan. Covered open portals leading to parking are allowed and encouraged.

2. One driveway curb cut with a maximum of 12'-0" in width is allowed. Shared driveways are permitted and shall have a maximum width of 18'-0" between the curb line and the build to line.

Building Height

1. Minimum and maximum building heights for the principal building shall be measured in number of floors. Minimum height shall be 2.5 floors and a maximum height of 3.5 floors.

2. A half story indicates a floor level above the eave line which is designed to be habitable.

3. First floor elevation shall be a minimum of 3'-0" above the adjacent sidewalk elevation. ADA housing units may be an exception.

4. Accessory buildings adjacent to North Commerce Street shall have a required height of 2.5 floors. All other accessory buildings shall be a maximum of 2 floors.

5. Basements are allowed in all structures and not counted as an additional floor.

Building Type III

COURTYARD MULTI-FAMILY RESIDENTIAL BUILDING

All building plans will be reviewed by the DCD to confirm compliance with the standards listed below. All building plans shall conform to the Wisconsin Administrative Code and all applicable building codes. DCD shall be responsible for interpreting the Neighborhood Code as well as approving minor variations.

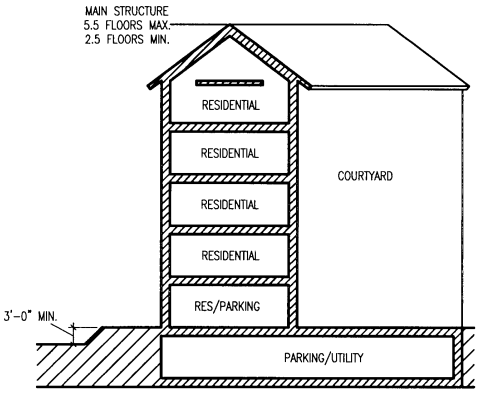
Building Use

1. The permitted location of building uses are as shown on the Building Use Diagrams.

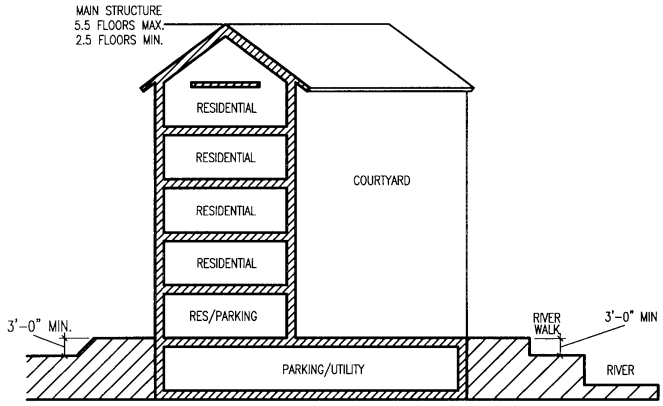
2. Open air structures such as arbors, gazebos and playground equipment are allowed.

3. Trash containers shall be screened from public view by means of fences, walls or other approved enclosures.

4. Basements are allowed and are not counted as additional gross floor area.



Building Use Diagram



Riverwalk Building Use Diagram

Building Placement

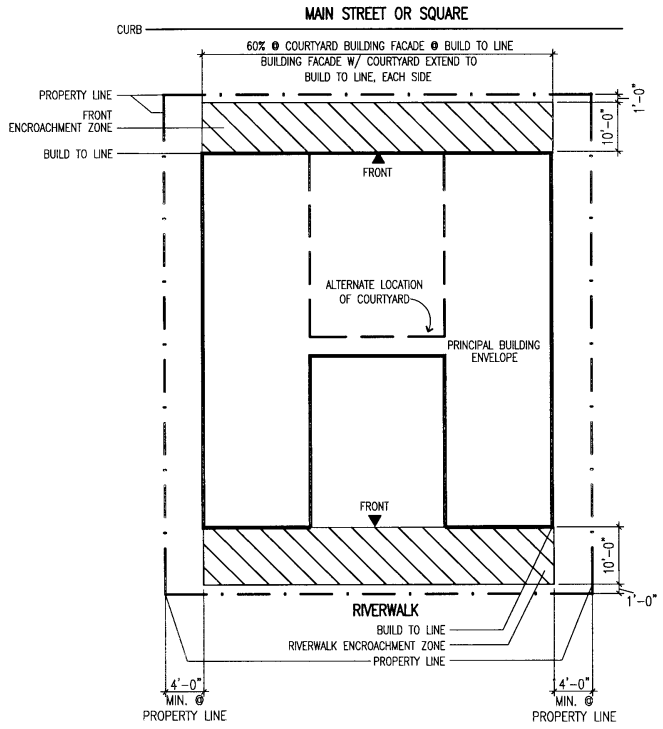
1. Principal buildings shall be set on lots relative to the property lines as shown on the appropriate Lot Diagram.

2. The front building façade must occupy a minimum of 60% of the lot frontage at the build to line. Building entries must be located on the front building façade, at either the build to line or in the courtyard. Refer to the Regulating Plan and lot diagrams for the designated front locations.

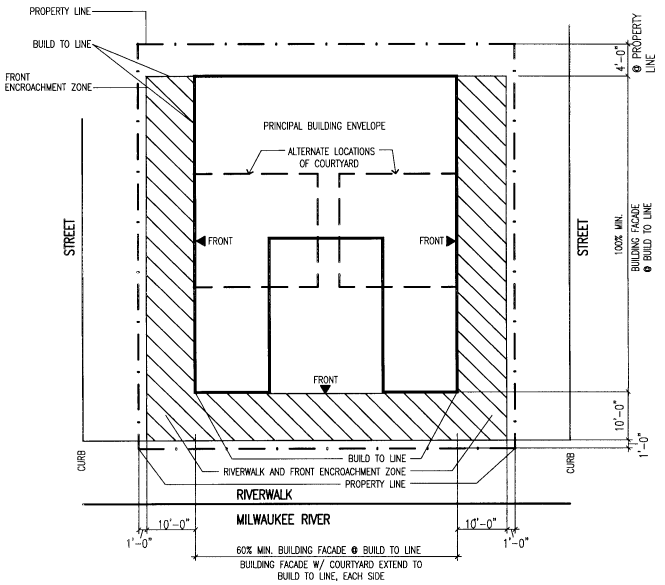
3. Build to lines located on lots with curved property lines at the street (see Regulating Plan) may be substituted with a straight line located at the average depth of the curved line.

4. For lots at the intersection of two streets or other public spaces, principal buildings shall have the entry walkway accessed from the front of the lot as indicated on the Regulating Plan.

5. For lots at the intersection of two streets or other public spaces, the side of the structure facing the public way which is not designated as 'front' is intended to create a built edge defining the boundary of the other street or public space. To achieve this, the principal building adjacent to the open space shall occupy both corners at the adjacent build to lines and a minimum of 60% of the lot frontage at the build to line.



Lot Diagram



Riverwalk Lot Diagram

Permitted Encroachments Beyond Build To Line and Setback Lines

1. Covered or uncovered open porches, balconies, stoops, bay windows and stairs to the building's first floor level are permitted within the encroachment zone shown in the appropriate Lot Diagram.

2. Garden walls and/or fences not exceeding 3'-6" in height shall be permitted within the encroachment zone. Garden walls and/or fences exceeding 3'-6" feet but not more than 6'-0" in height shall be permitted on the build to line, a common property line, or within side or rear yards.

3. Eaves may extend up to 4'-0" into the encroachment zone, and no closer than 1'-0" from a common property line. In no case may an eave extend beyond the property line or over a utility easement.

Parking

1. One garage door per street per building is permitted Covered open portals leading to parking are allowed and encouraged.

2. Driveways shall have a maximum width of 18'-0" between the curb line and the build to line.

3. On-site parking is not permitted within the encroachment zone.

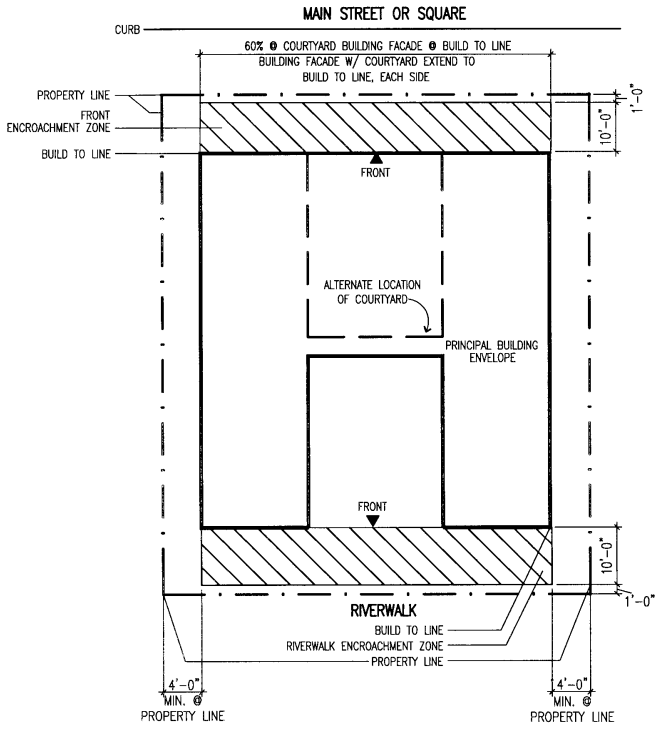
Building Height

1. Minimum and maximum building heights for the principal building shall be measured in number of floors. Minimum height shall be 2.5 floors and a maximum height of 5.5 floors.

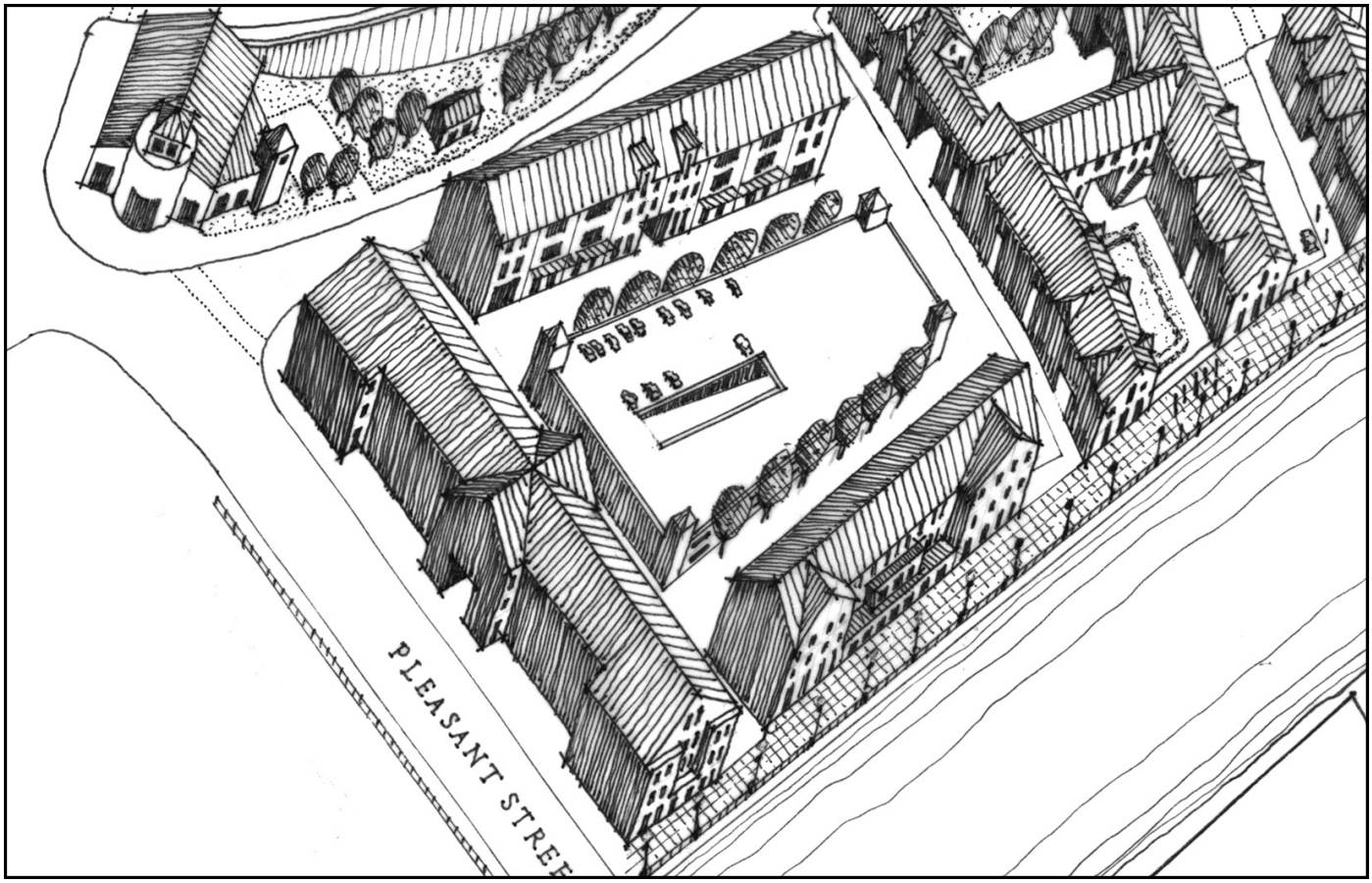
2. A half story indicates a floor level above the eave line which is designed to be habitable.

3. First floor elevation shall be a minimum of 3'-0" above the adjacent sidewalk elevation. ADA housing units may be an exception.

4. Basements are allowed in all structures and not counted as an additional floor.



Riverwalk Lot Diagram



Building Type IV

MIXED USE: RESIDENTIAL/COMMERCIAL

All building plans will be reviewed by the DCD to confirm compliance with the standards listed below. All building plans shall conform to the Wisconsin Administrative Code and all applicable building codes. DCD shall be responsible for interpreting the Neighborhood Code as well as approving minor variations.

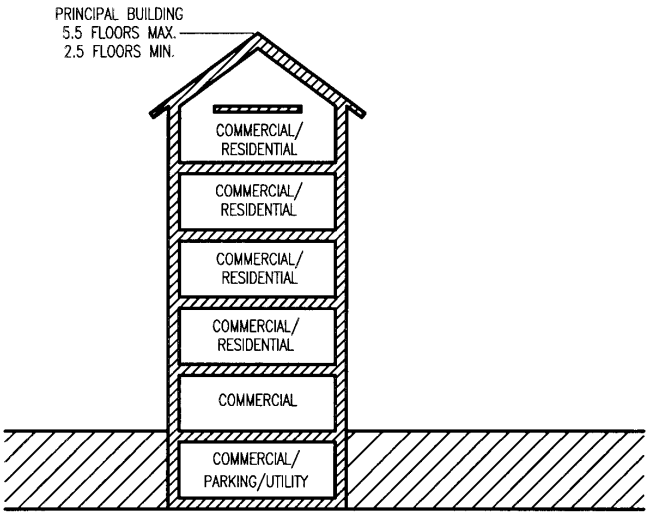
Building Use

1. The permitted location of building uses are as shown on the Building Use Diagrams.

2. Open air structures, such as arbors, gazebos and playground equipment are allowed in addition to an accessory building.

3. Trash containers shall be screened from public view by means of fences, walls or other approved enclosures.

4. Basements are allowed in all structures and are not counted as additional gross floor area.



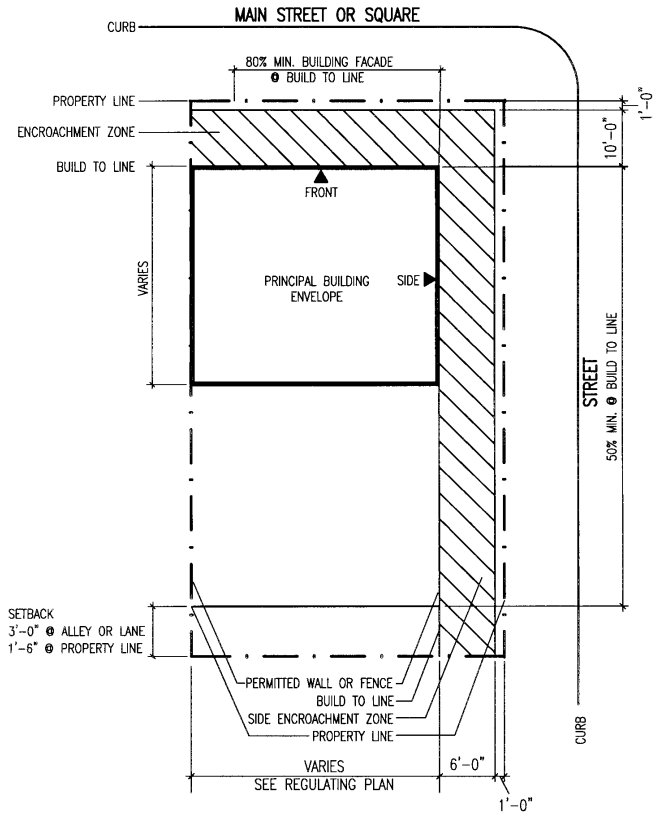
Building Use Diagram

Building Placement

1. Principal buildings and accessory buildings shall be set on lots relative to the property lines as shown on the Lot Diagram.

2. The front building façade must occupy a minimum of 80% of the lot frontage at the build to line. Building entries must be located on the front building façade. Refer to the Regulating Plan and lot diagrams for the designated front locations.

3. Build to lines located on lots with curved property lines at the street (see Regulating Plan) may be substituted with a straight line located at the average depth of the curved line.



Lot Diagram

Permitted Encroachments
Beyond Build To Line and Setback Lines

1. Covered or uncovered open porches, balconies, stoops, bay windows and stairs to the building's first floor are permitted within the encroachment zone shown in the appropriate Lot Diagram.

2. Front encroachment zones are to be hard surface between the build-to line and the curb.

3. Garden walls and/or fences not exceeding 3'-6" in height shall be permitted within the encroachment zone. Garden walls and/or fences exceeding 3'-6" feet but not more than 6'-0" in height shall be permitted on the build to line, a common property line, or within side or rear yards.

4. Eaves may extend up to 4'-0" into the encroachment zone, and no closer than 1'-0" from a common property line. In no case may an eave extend beyond the property line or over a utility easement.

Parking

1. One garage door per street per building is permitted. Covered open portals leading to parking are allowed and encouraged.

2. Driveways shall have a maximum width of 18'-0" between the curb line and the build to line.

3. On-site parking is not permitted within the encroachment zone.

Building Height

1. Minimum and maximum building heights for the principal building shall be measured in number of floors. Minimum height shall be 2.5 floors and a maximum height of 5.5 floors.

2. A half story indicates a floor level above the eave line which is designed to be habitable.

3. Basements are allowed in all structures and not counted as an additional floor.

5.3 Architectural Code

5.3.1 Introduction

The Architectural Code addresses issues of architectural character of the development.

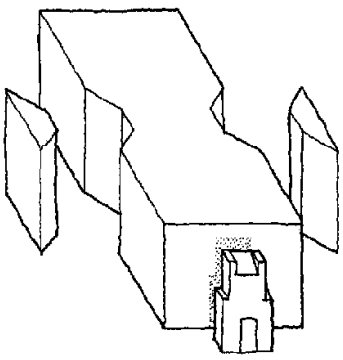
The purpose of the Architectural Code is to ensure that the Master Plan is realized in a manner compatible with the best architectural qualities of Milwaukee's traditional buildings. Specifically, it is an attempt to resist the loss of urban character and identity by insisting new development recognize and blend with the existing urban fabric and neighborhood character. This is done in order to form a harmonious addition to the existing community sharing those characteristics of traditional buildings with respect to form and materials.

The Architectural Code which was derived from examples in the surrounding neighborhoods of Brewers Hill, Riverwest, and the Lower Eastside should be used as an aesthetic guide for the implementation of built elements in response to the goals of the Neighborhood Code. Many of these architectural precedents are found in Section 3.2 Surrounding Built Context.

5.3.2 Architectural Code

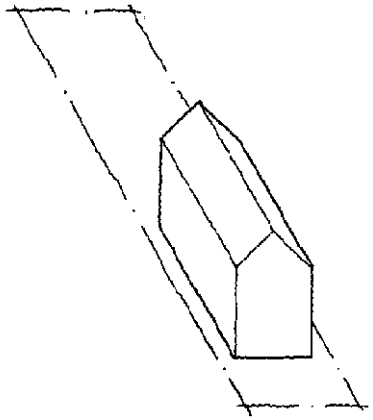
Common Language

The similarities within design solutions that transcend architectural style, and building type to create an enduring sense of design and character within a region are termed the "common language". This section identifies specific design elements or attitudes which serve as the common language that contribute to Milwaukee's sense of place and are thus recommended for the Beer Line "B" development.



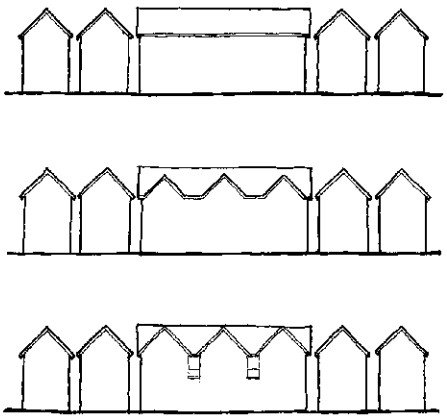
Massing

- Milwaukee buildings are typically compact block masses from which pieces are then carved out of or added to. New construction shall seek to emulate this precedent.



- Traditionally Milwaukee buildings are narrow but deep, and tall. These conditions are historically a result of the typical building lot, which is narrow (30 feet) and deep (120 feet). While Beer Line "B" lots may be a compilation of several lots, new construction should maintain the appearance of the narrow and tall Milwaukee building.

  Building facades shall be vertically oriented. Where a building's size or organization promotes a horizontal massing, the façade shall be articulated to accentuate an overall reading of verticality.



- Roof gables shall face the street. Ridgelines may be parallel to the street provided a large prominent gable is facing the street to maintain the rhythm of gables along the street. On long roofs paralleling the street, large prominent gables facing the street shall be repeated elements used to break up the mass of

the roof, and to help maintain the rhythm of gables facing the street.

Building Elements


- For buildings on a street, main entries shall face the street and be visible from the street. Doors and frames shall be prominently articulated when visible from the street


- Porches and stoops help provide pedestrian scale to buildings and create an important transition from the public realm to private space. Refer to the Urban Code, section 5.2 for porch and stoop requirements.


- Balconies provide a porch element for upper floors, and are strongly encouraged, particularly with duplexes, townhouses and other residential conditions. Balconies should have enough room to promote their use as an outdoor space. They are a means of providing human scale to buildings and also provide "eyes on the street".


- Bays projecting out into the encroachment zone allow occupants to see up and down the street, providing for "eyes on the street". The use of bays is encouraged.

- Gabled pitched roofs are required on all single and duplex houses. Pitches shall either be sloped at twelve horizontally for each twelve feet vertically ("12 in 12"), or 14 in 12. Grambrel roofs are allowed. Gables shall face the street. Framed gable roofs allow for attic space or future expansion space unlike trussed roofs, and therefore are strongly encouraged. On larger building types, gables or flat roofs are acceptable when in done accordance with common local precedents.


- Dormers provide a means to admit light and views to attic space areas. When converting attic into additional floor area, dormers can provide additional floor area with head-height space. Dormers also offer an opportunity to modify scale and proportion of large roof masses.

- It is strongly encouraged that all primary windows be vertically oriented with a minimum ratio of 2 units vertical: 1 unit wide. The use of double hung windows is also strongly encouraged. With the exception of storefront windows on the ground floor of commercial buildings, all windows considered to be primary elements of a facade shall be at least square.

  Window openings shall be articulated. In masonry- and stucco-finished exterior walls, sills are mandatory and an articulated lintel is encouraged. In clapboard or shingled exterior walls, windows shall be trimmed and "cased out", with ornamental lintels encouraged.

- Buildings are encouraged to utilize traditional tripartite massing and façade composition (base, body, and cap). The height of these components should be coordinated between adjacent buildings. Articulation and materials are encouraged to change or be used differently between each layer.

- No specific "architectural style" is specified or required. Since the historic built environment is predominately Italianate and Victorian, these styles may provide a good starting point for the design and understanding of different building elements and materials.

Materials Palette

The following is a list of materials considered acceptable for use in the Beer Line "B" site. Some materials have restrictions or uses which are described per individual material. Other exterior materials may be used if prior approval is granted by the design review board, on an individual basis.

The acceptable buildings materials have been chosen to be complementary with the existing buildings in the surrounding neighborhoods. The acceptable materials should be used in a manor reflecting traditional building methods and detailing. Buildings will be reviewed on an individual basis to insure conformity with the intent of the Code.

- Stone: The use of limestone is acceptable for the construction of all building types. Other types of stone may also be acceptable upon review.

- Precast Concrete and Cast Stone: Precast concrete and/or cast stone is an acceptable substitute for natural stone, to be reviewed on a case by case basis.

- Brick: Common-sized brick is acceptable for the construction of all building types. This does not preclude the use of special and shapes sizes of brick for accents. Predominant brick colors to be used are "cream city", reds, reddish browns, and browns. Larger sized brick is acceptable for all building types other than residential.

- Concrete Masonry Units (CMU): Decorative CMU is acceptable as an exterior cladding for all building types. It is to be restricted to a secondary material of less than 30% of an elevation or as an accent material, such as split faced block used as a rusticated base. The use of standard (gray, plain textured) utility block is not acceptable anywhere as an exposed material.

- Terracotta: Terracotta is an acceptable accent material on brick and stucco clad buildings.

- Stucco: Stucco is acceptable as an exterior building material for all building types. Used traditionally as a wall finish material on upper floors and gables, stucco may also be used as a primary wall finish material. Colors and textures should conform to the more traditional cladding colors found in the area.

- Exterior Insulated Finish System (EIFS): EIFS is an acceptable substitute for stucco. The use of EIFS as a finish for trim in addition to a wall finish is not acceptable. The use of EIFS in locations susceptible to impacts and in close proximity to grade should be avoided.

- Clapboard Siding: Painted wood clapboard with exposed laps not greater than 6" is acceptable for the construction for all residential building types. Metal and vinyl siding should be avoided where possible as these systems easily warp and dent, and terminate in aesthetically awkward manners. They also come in very limited colors that can be difficult to match over time due to fading and different color runs. The use of vinyl and metal siding is restricted to difficult out-of-reach areas, such as dormers or gables above the second floor.

- Wood Shingle Siding: Wood shingle siding is acceptable as a siding material on upper floors and gables on all residential building types.

- Ornamental Metals: Ornamental metal is acceptable as an accent material for all building types. Railings, copper panels, grills, etc., provide a good opportunity for detail and articulation.

- Asphalt Shingles: Asphalt shingles are acceptable as a building material for roofing on all building types. The use of asphalt shingles as a vertical siding material is not acceptable. Attention should be paid to color and style selection to enhance compatibility with nearby use.

- Glazed Roofing Tile: Glazed roofing tile is acceptable as a roofing material on all building types.

- Standing Seam Metal Roofing: Standing seam metal is acceptable as a building material on all non-residential building types and low-pitched residential porch or balcony roofs less than 4:12 pitches.

Appropriate Use of Materials

- A visit to the neighborhoods surrounding the Beer Line "B" site will quickly reveal that the larger or more important a building is, the more likely it is to be constructed of more permanent/ solid materials. Schools and churches use brick and stone. Apartment blocks and mixed-use buildings tend to be predominately brick construction with a variety of accent materials. Residences are usually, but not always built of wood. Industrial buildings are typically brick.

- When horizontal changes in materials are desired, different materials should meet only at a change of plane, particularly at an inside corner. This gives the material a sense of thickness and a perception of permanence and quality. Different materials should never meet at an outside corner as this reveals the thinness of the material.

- When adjacent vertical changes in materials are desired, different materials should meet with the upper material overlapping the lower material, sealed by an ornamental trim detail.

Performance

- A common language shall be used throughout the development. While based on extant examples in adjacent neighborhoods, the common language may be amended to include positive trends and practices occurring within the Beer Line "B" site that improve upon, reinforce, and complement nearby new development.

- The common language is intended to allow a variety of building and housing types, styles and economic levels to coexist in a harmonious manner.

- Every building should provide the opportunities for "eyes on the street." Porches, stoops, balconies, and bay windows allow residents to observe and even participate in the street life from their homes and places of employment.

- Because development will be visible from the surrounding bluffs and intersecting bridges, selection of roofing materials, the layout of roofs, and the location of rooftop mechanical equipment is of critical importance and should be designed in accordance with the rest of the building.

- All building elevations through the use of building elements and materials shall be designed to provide a sense of human scale at the street level.

- Design performance shall be evaluated not only by its ability to fulfill the needs of the new development, but also blend compatibly and/or enhance adjacent

development and benefit the entire community.

5.4 Landscape Code

5.4.1. Introduction

The purpose of the Landscape Code is to encourage the establishment of a consistently high-quality landscape throughout the Beer Line "B" site. The code differentiates between types of spaces based on scale, degree of public use, and surrounding built pattern and identifies appropriate landscape treatments for each type of space.

Public space shall be recognized as the principal space. This includes but is not limited to streets, squares, parks, riverwalks, and pedestrian paths. Private space bordering public space shall be developed and designed to support and contribute to the quality and character of the public space. This includes but is not limited to building facades, front yards, backyards, courtyards, porches, walkways, and stoops.

Each of the space types is identified by name, diagrammed and described as to the intended character and appropriate palette. The public domain and private open spaces identified are as follows: Street Rights-of-Way, Residential Square, Crescent Street, Riverwalk, Bluff, Surface Parking, and Private Open Space.

Enforcement of this landscape code will yield a hardy, richly diverse, yet harmoniously balanced landscape throughout the project area.

5.4.2 Street Rights-Of Way

Street trees shall be planted in straight rows of single species that follow street alignments and curving long walks. Each street and drive should be assigned its own tree species. Trees shall be planted 20 feet on center. Select species from the following palette.

Plant Palette

Acer x freemanii "Autumn Blaze"
(Autumn Blaze Red Maple)

Celtis occidentalis
(Common Hackberry)

Fraxinus americana "Autumn Purple"
(Autumn Purple Ash)

Fraxinus pennsylvanica "Marshall's Seedless"
(Marshall's Seedless Green Ash)

Tilia x "Redmond"
(Redmond Linden)

Ulmus x "Regal
(Regal Elm)

5.4.3 Residential Square

The Residential Square follows the traditional "village green" concept of being a public open space around which other uses can be organized. They are historically characterized by either well-managed lawns useful for picnics, socializing and play, or articulated pavement. Either ground condition is accompanied by trees that buffer wind and provide shade in season. Additionally, they provide an address and distinct identity for the surrounding buildings. The residential square should be planted in an even fashion, concentrated on the edges.

Trees to be planted 20 feet on center. A single species should be selected from the following palette to form the perimeter of the square.

Plant Palette

Acer x freemanii "Autumn Blaze"
(Autumn Blaze Red Maple)

Fraxinus americana "Autumn Purple"
(Autumn Purple Ash)

Ulmus x "Regal"
(Regal Elm)

5.4.4 Hubbard Street Promontory

The Hubbard Street promontory shall be planted with an alle' of trees, approximately 20 feet on center along the perimeter edge of the raised promontory, with smaller ornamental trees around deep tunnel access structure within the linear park along Commerce Street.

Plant Palette

To form the alle' along the perimeter road around the crescent, a single species should be planted from the following palette.

<u>Shade Trees:</u>
Tilia x "Redmond
(Redmond Linden)

Acer x freemanii "Autumn Blaze"

(Autumn Blaze Red Maple)

Fraxinus americana "Autumn Purple"
(Autumn Purple Ash)

Ulmus x "Regal"
(Regal Elm)

Ornamental Flowering Trees: Trees to be planted 15 feet on center. A single species should be selected from the following palette to follow the curvature of the paving around the tunnel access structure.

Malus "Robinson"
(Robinson Crabapple)

Malus "Prairifire"
(Prairie Fire Crabapple)

Malus "Donald Wyman"
(Donald Wyman Crabapple)

5.4.5 Riverwalk

The riverwalk parallels the Milwaukee River and provides users with opportunities to view and engage the riverfront. The riverwalk will traverse areas where its river edge are at times either vertical walls or sloping rock revetment, as depicted in the diagrams below. The addition of trees and shrubs, which includes native species, will add a naturalizing element and increased wildlife habitat along the riverwalk.

Trees and shrubs shall be planted in a naturalistic manner. Trees shall be planted singly and as masses. Shrubs shall be planted in masses of odd numbers, usually 3, 5 or 7, and usually as understory to the canopy trees, from the following palette:

Plant Palette

Shade Trees:
Acer x freemanii "Autumn Blaze"
(Autumn Blaze Red Maple)

Celtis occidentalis
(Common Hackberry)

Fraxinus americana "Autumn Purple"
(Autumn Purple White Ash)

Tilia x "Redmond"
(Redmond Linden)

Small Trees (12-25' Ht.):
Acer ginnala
(Amur Maple)

Amelanchier laevis
(Allegheny Serviceberry)

Amelanchier x grandiflora
(Serviceberry)

Cornus alternifolia
(Pagoda Dogwood)

Large Shrubs (6'12' Ht.)
Cornus racemosa
(Grey Dogwood)

Cornus sericea
(Red-twig Dogwood)

Rosa setigera
(Prairie Rose)

Viburnum dentatum
(Arrowwood Viburnum)

Small Shrubs (2-1/2' - 6" Ht.):
Aronia melanocarpa
(Black Chokeberry)

Rosa regosa
(Rugosa Rose)

Rosa virginiana
(Virginia Rose)

Rhus aromatica "Gro Low"
(Gro Low Fragrant Sumac)

5.4.6 Bluff

The bluff shall remain articulated in a natural manner and stabilized with native trees, shrubs and grasses at the top of the slope (Zone 1) and shrubs and grasses down the slope (Zone 2). This area requires selective tree removal and pruning that will provide enhancement of views and, over time, the eradication of undesirable invasive species. As the bank is revegetated, the plant palettes below are recommended.

Trees and shrubs shall be planted in a naturalistic manner. Trees shall be planted singly and as masses. Shrubs shall be planted in masses of odd numbers, usually 3, 5 or 7, and usually as understory to the canopy trees, from the following palette:

Plant Palette, Zone 1

Shade Trees:
Carya ovata
(Shagbark Hickory)

Celtis occidentalis
(Common Hackberry)

Gymnocladus dioica
(Kentucky Coffeetree)
Prunus serotina
(Black Cherry)

Quercus macrocarpa
(Bur Oak)

Quercus muehlenbergii
(Chinkapin Oak)

Quercus rubra
(Red Oak)

Small Trees (12′-25′ Ht.):
Amelanchier laevis
(Allegheny Serviceberry)

Cornus alternifolia
(Pagoda Dogwood)

Crataegis crus-galli
(Cockspur Hawthorn)

Large Shrubs (6′-12′ Ht.):
Amelanchier canadensis
(Shadblow Serviceberry)

Cornus racemosa
(Grey Dogwood)

Rhus glabra
(Smooth Sumac)

Viburnum dentatum
(Arrowwood Viburnum)

Small Shrubs (2-1/2′-6′ Ht.):
Aronia melanocarpa
(Black Chokeberry)

Rosa setigera
(Prairie Rose)

Rosa virginiana
(Virginia Rose)

Rhus aromatica “Gro Low”
(Gro Low Fragrant Sumac)

Plant Palette, Zone 2:

Small Trees (12′-25′ Ht.):
Rhus typhina
(Staghorn Sumac)

Large Shrubs (6′-12′ Ht.):
Cornus racemos
(Grey Dogwood)

Cornus rugos
(Roundleaf Dogwood)

Rhus aromatica
(Fragrant Sumac)

Rhus glabra
(Smooth Sumac)

Viburnum dentatum
(Arrowwood Viburnum)

Small Shrubs (2-1/2′ - 6′ Ht.):
Diervilla lonicera
(Dwarf Bushhoneysuckle)

Rhus aromatica “Gro Low”
(Gro Low Fragrant Sumac)

Rosa setigera
(Prairie Rose)

Symphoricarpos orbiculatus
(Indiancurrent Coralberry)

Grasses and Forbs Seed Mix:
Both Zones 1 and 2 shall be planted with native prairie seed mix. The seed mix shall be a balanced mixture of 20-25 forbs and 4-5 grasses from the following table in the quantities prescribed by a local native seed nursery, such as Prairie Nursery, Westfield, Wisconsin. See table of Dry Prairie Species.

5.4.7 Surface Parking

Surface parking lot(s) shall have planting medians with shade trees and screening along edges in the form of either an architectural wall plus vines or a vegetative hedge.

Trees shall be planted 20 feet on center. Select species from the following palette.

Plant Palette

Shade Trees:
Acer x freemanii "Autumn Blaze"
(Autumn Blaze Red Maple)

Celtis occidentalis
(Common Hackberry)

Fraxinus americana "Autumn Purple"
(Autumn Purple Ash)

Fraxinus pennsylvanica "Marshall's Seedless"
(Marshall's Seedless Green Ash)

Tilia x "Redmond"
(Redmond Linden)

Shrub Hedge (3'-5' Ht.):
Lonicera x xylosteoides "Clavey's Dwarf"
(Clavey's Dwarf Honeysuckle)

Ribes alpinum
(Alpine Current)

Vines:
Clematis maximowicziana
(Sweet Autumn Clematis)

Hedera helix "Baltica"
(Baltic Ivy)

Parthenociccus tricuspidata
(Boston Ivy)

5.4.8 Private Open Space

Homes shall have a rich, more horticultural character that focuses on the use of native species, though non-natives may be used sparingly for special ornamental value. Perennial flower masses should include native wildflowers from the prairie palette recommended in 5.4.6.

Follow spacing and massing guidelines recommended by a local nursery professional.

Plant Palette

Shade Trees:
Aesculus hippocastanum
(Horsechestnut)

Acer x freemanii "Autumn Blaze"
(Autumn Blaze Red Maple)

Acer saccharum
(Sugar Maple)

Acer rubrum "Red Sunset"
(Red Sunset Maple)

Fraxinus americana "Autumn Purple"
(Autumn Purple Ash)

Tilia cordata "Greenspire"
(Greenspire Littleleaf Linden)

Small Trees (12'-25' Ht.):
Acer ginnala
(Amur Maple)

Amelanchier laevis
(Allegheny Serviceberry)

Amelanchier x grandiflora "Princess Diana"
(Princess Diana Serviceberry)

Amelanchier x grandiflora "Strata"
(Strata Serviceberry)

Cornus alternifolia
(Pagoda Dogwood)

Crataegus phaenopyrum
(Washington Hawthorn)

Crataegus viridis "Winter King"
(Winter King Hawthorn)
Hamamelis virginiana
(Witchhazel)

Viburnum prunifolium
(Blackhaw Viburnum)

Large Shrubs (6'-12' Ht.):
Aronia melanocarpa var. alata
(Glossy Black Chokeberry)

Viburnum carlesii
(Koreanspice Viburnum)

Viburnum dentatum
(Arrowwood Viburnum)

Small Shrubs (<6' Ht.):
Diervilla lonicera
(Dwarf Bushhoneysuckle)

Fothergilla gardenii
(Dwarf Fathergilla)

Lonicera x xylosteoides "Clavey's Dwarf"
(Clavey's Dwarf Honeysuckle)

Lonicera x xylosteoides "Miniglobe"
(Miniglobe Honeysuckle)

Rhus aromatica "Low Gro"
(Grow Low Fragrant Sumac)

Rosa virginiana
(Virginia Rose)

Groundcovers and Vines:
Clematis maximowicziana
(Sweet Autumn Clematis)

Euonymous fortunei "Coloratus"
(Purpleleaf Wintercreeper)

Hedera helix "Baltica"
(Baltic Ivy)

Parthenociccus tricuspidata
(Boston Ivy)

Parthenocissus quinquefolia "Engelmannii"
(Englemann Virginia Creeper)

Vinca minor
(Periwinkle)

Evergreen Trees (> 20'):
Abies concolor
(White Fir)

Picea glauca
(White Spruce)

Picea glauca var. densata
(Black Hills Spruce)

Pinus strobus
(White Pine)

Pseudotusuga menziesii
(Douglas Fir)

Tsuga canadensis
(Canada Hemlock)

Evergreen Large Upright Shrubs (10'-20'):
Juniperus chinensis "Mount Batten"
(Mountbatten Juniper)

Thuja occidentalis "Techny"
(Techny Arborvitae)

Evergreen Medium Shrubs (3'-10' Ht.):
Juniperus chinensis "Hetzii"
(Hetz Juniper)

Juniperus chinensis "Pfitzeriana"
(Pfitzer Juniper)

Taxus cuspidata "Nana"
(Dwarf Japanese Yew)

Evergreen Small Shrubs(<3' Ht.):
Juniperus chinensis var. sargentii
(Sargent's Juniper)

Juniperus procumbens
(Japanese Garden Juniper)

Juniperus sabina "Broadmoor"
(Broadmoor Savin Juniper)
Pinus mugo "Compacta"

(Compact Mugho Pine)

Taxus cuspidata “Monloo”
(Monloo Yew)

Taxus x media “Andersonnii”
(Anderson’s Yew)

Prostate Evergreens (<1′ Ht.):
Juniperus horizontalis “Hughes”
(Hughes Juniper)

Juniperus horizontalis “Wiltonii”
(Blue Rug Juniper)

Juniperus horizontalis “Wisconsin”
(Wisconsin Juniper)

Juniperus procumbens “Nana”
(Dwarf Japanese Garden Juniper)

Chapter 6 • Appendices

6.1 Market Overview

6.1.1 Demographics

The City of Milwaukee, as well as the metropolitan area, represents a large and growing market. The City's population of approximately 630,000 ranks as the nation's 17th largest city. Milwaukee County's population is nearly 1.0 million, while the four-county metropolitan area exceeds 1.4 million, making Greater Milwaukee the 32nd largest metropolitan statistical area. Metropolitan growth has averaged 2.5% annually since 1980. (See Table 6.1.1 for demographics of metro area.)

	Downtown	10-Mile Radius	Four-County Metro Area
1990 Census	7,188	923,370	1,432,149
1995	7,200	925,000	1,485,094
2000	7,790	927,000	1,542,500
Demographics - Sex			
Male	4,086	436,565	689,423
Female	3,102	486,805	742,725
Demographics - Age			
Less than 5	32	72,874	109,137
5 to 17	58	64,177	267,003
18 to 24	2,734	100,715	144,847
25 to 44	2,706	299,925	469,246
45 to 64	985	158,370	263,401
65 and over	673	127,309	178,515
Total Households	3,713	360,681	537,722
One-person	2,341	107,300	137,178
Family	522	229,665	369,799
Households w/children	58	117,244	179,714
Single parent w/children	26	45,884	49,672
Average	1.24	2.49	2.60
Median Incone (1989)	$26,067	$28,855	$32,316

Table 6.1.1 • Population and Demographic Data
Source: US Census, 1990; Southeastern Wisconsin Regional Planning Commission

6.1.2 Cost of Living

Milwaukee's cost of living is approximately 3% above the United States' average. This compares to costs of living which are 10% - 52% above average in major northeastern United States cities; and 15% - 31% above average in southern California.

Milwaukee is ranked as one of the most affordable housing markets of the nation's largest cities according to an industry survey released by the National Association of Home Builders in 1992.

The median sale price of an existing single family home in metro Milwaukee was $96,100 in 1992, compared to Chicago at $131,000; New York at $169,300; and Seattle at $141,300.

Projections by WEFA indicate that home values will outpace inflation by 3.42% over the next three years.

Downtown Housing

While a large amount of housing is currently being developed in Downtown Milwaukee, even more is under consideration. The following list projects approximately 800 new downtown housing units in addition to the proposed development at Beer Line "B."

Downtown-area Housing Currently Under Development in Milwaukee

- **Brewer's Point Apartments** (This project is part of the Beer Line "B" project area.)

  This project is an adaptive reuse of the long-abandoned Gimbel's warehouse on Commerce Street across the Milwaukee River from Downtown. Brewer's Point Apartments will have 47 two-bedroom units, 40 one-bedroom units, and 20 studio apartments. Eighty-two parking spaces will be created within the building, with 76 on-site spots also available. Rents are expected to range from $550 to $1,150.

  Developer and owner Mike Carnahan received a $3.8 million first mortgage from Equitable Bank for the project, and the Milwaukee Economic Development Corporation provided a $1.2 million second mortgage.

- **Cawker Building Condominiums** Development partners Dick Leep and John Raettig are following their success at creating housing in the former Gallun Tannery offices by renovating the historic Cawker Building in the center of Downtown, at 108 West Wells Street, into about 20 riverfront condos. The condos will be developed in the vacant upper four floors of the office building, which was built in 1897 on the Milwaukee River at the northeast corner of West Wells Street and North Plankinton Avenue.

  Most of the condos have been sold, and construction is underway. Prices of the units range from $62,000 to

$143,000. The typical condo has two bedrooms and 1,200 square feet. No city funding is involved, although sections of the $11 million Riverwalk system are on adjacent blocks and a new Riverwalk segment is being planned for this block. The first units are expected to be occupied in late summer of 1997. The building, which was constructed in 1897, lies across the river from the theater district and across the street from Rock Bottom Brewery.

- **City Hall Square Apartments** Groundbreaking took place recently on this $28 million mixed-use renovation project encompassing almost an entire city block on the Milwaukee River across the street from Milwaukee's spectacular, 100-year old City Hall. The project's $16 million first phase will create about 140 one-and two-bedroom apartments, with about 30 units to be built in the second phase. The development will include 80,000 square feet of commercial space.

  The project consists of nine largely vacant historic buildings constructed mainly from the mid 1800's to the early 1900's in what was the heart of the downtown retail district in the mid-nineteenth century. The development is one of the largest historic preservation efforts in Milwaukee history.

  About 100 of the units will be at market rate, with rents ranging from about $775 to $1,100. The remaining units will have monthly rents for qualifying people of $490 to $585. (The lower rents will be in effect for 15 years because of a federal tax credit program used for this project.) The City is providing infrastructure and a $5.15 million loan for the project. Occupancy is scheduled to begin in early 1998, with the project slated for completion in late 1998.

- **Lake Bluff at East Pointe** The next phase of the successful East Pointe residential development, on the north edge of Downtown, will be the $15 million Lake Bluff at East Pointe, a four-story, 109-unit luxury apartment building on the 1300 block of North Prospect Avenue overlooking Lake Michigan. Monthly rents are estimated at $800 to $2,000. Units will have fireplaces and high ceilings, underground parking and views of Lake Michigan from the bluff. The City recently approved a $1.5 million second mortgage loan as part of the project. The City will also provide public infrastructure, site improvements and a new pedestrian connection to the lakefront. Construction started during the summer of 1997, with occupancy slated for fall 1998.

- **Library Hill Apartments** Construction has begun for the $10.5 million Library Hill Apartments, which will be built on the block east of Milwaukee's historic Central Library. Library Hill will consist of a new, four-story, courtyard-style building with 110 one-, two-, and three-bedroom apartments. The City is providing the land and covering the costs of acquisition, demolition, and relocation, which may total an additional $5 million. Completion is expected in early 1999.

- **Milwaukee Street Apartments** The owners of two adjoining historic 1800's commercial buildings at 715 and 723 Milwaukee Street, just north of Wisconsin Avenue, are renovating the third and second floors into a total of 10 one- and two-bedroom apartments. Rents are expected to range from $770 to $1,000 per month. The City has approved a $350,000 second mortgage loan as part of the $850,000 project, which includes renovation of the ground floor retail space. Construction is underway, with completion by late fall.

- **Riverfront Lofts Condominiums** Tandem Realty Corporation of Chicago is turning the 10-story former Nelson Brothers furniture warehouse on North Plankinton into 48 luxury condominiums. Located on the Riverwalk in the center of Downtown, Riverfront Lofts will soon be offering condos priced from $107,000 to $297,000. Construction could start this fall, with new residents moved in as early as January. The building will include new individual balconies. The partially vacant building currently contains 12 apartments, which will be among the new condos. The building was constructed for commercial use in 1915 and designed by Armand Koch, son of Henry C. Koch, architect of City Hall and the Pfister Hotel.

- **Riverwalk Plaza Condominiums** Plans for the $9.5 million renovation of two historic and largely vacant buildings on the Milwaukee River into 79 condominiums have moved ahead of schedule. All units are reserved. The loft-style condos will include a riverwalk, boat slips, and new balconies. The condos will sell for $65,000 to $170,000. The five- and six-story buildings, constructed in 1889 and 1894, were used for shoe manufacturing and grocery

warehousing. The project is privately financed and developed, although the City will help provide riverwalks for the two buildings.

- **The Ware House Apartments** Forty-three loft-style apartments are being developed in the $4.1 million renovation of the 104-year old former Shadboldt and Boyd building, originally constructed for a wholesaler of iron and steel, carriage hardware and wagon woodwork. Construction is underway. The six-story building will include 33 underground parking spaces and 42 surface spots, with rents ranging from $795 to $1,895 a month. Likely tenants include professionals from nearby Wisconsin Electric and Blue Cross corporate offices.

- **City Hall Square, Phase II** The second phase of City Hall Square, which is slated to be completed next year, will consist of 30 apartments renovated from historic buildings on Water Street.

- **Westown Area** The tax incremental district developed for the Library Hill Apartments could support an additional 200 housing units in the area, especially on the block between North 6th and North 7th Streets and across from the library.

- **Other projects** Smaller projects of 10 to 30 units each could take place on Milwaukee Street, in the Third Ward and on Plankinton. Other Class B office buildings downtown are candidates for residential conversions. Also, the East Pointe project has three additional phases on the drawing boards.

Other Downtown-area Housing Projects

- **East Pointe Commons** 188 rental units with both apartments and townhome units. The size of the units range from 790 square foot one-bedroom units to 1,825 square foot three-bedroom units.

- **Yankee Hill** Yankee Hill is a ten-year old housing project with a combination of townhomes and highrise apartments. The project includes 350 units consisting of one-bedroom units ranging in size from 675 – 775 square feet, and two-bedroom apartments ranging in size from 1,015 – 1,200 square feet. The rents range from $715 - $1,240 per month.

- **The Blatz** This is a renovated brewery complex with 169 one- and two-bedroom units ranging in size from 680 square feet to 1,450 square feet with rents ranging from $800 to $1,600.

6.1.3 Market Demand

A comprehensive market analysis was not part of the scope of this project. The counsel of local developers and commercial real estate was sought out to inform our process. The input of Barry Mandel and Richard Lincoln of the Mandel Group, and Jeff Siegel of Siegel-Gallagher, Inc. was particularly valuable.

Housing

There is not a prevailing "pent-up" market for the Beer Line "B" development. The market for this project is segmented. The housing developed on the site must respond with a variety of housing types to appeal to a variety of market segments. It is anticipated that the predominant market will be a young population, dual income no kids, and single, young professionals. There is a demand for high quality, affordable housing (not subsidized).

There is a demand for both condominium- and rental development. There is the potential to tap into "walk to work" programs for corporations in the immediate vicinity of the site. Between 2,000 and 3,000 people work at Schlitz Park with Blue Cross/Blue Shield, Warner Cable, and Humana Health Care being the largest employers. It is very important that the unit types respond to the market place. For example, a very successful unit type at East Pointe Commons was the two-bedroom, two bath units that has been popular with the young professional market segment.

The boat docks have also been very successful amenities as a selling feature of the housing. Much of the floating "dockominiums" are delivered in a "turnkey" operation at no expense to the developer. Security features must be part of the design of the private docks.

It is anticipated that the rental units will yield $.90/square foot/month. ($900 for a 1,000 square foot unit) The cost of construction will range between $80 - $100/per square foot.

Retail

The service retail for this area is well served by East Point, Brady Street, Martin Luther King Drive, and the potential Jewel/Osco development at the Humboldt Yards at the east end of the site.

The type of retail that could work well along the Beer Line "B", particularly along the Riverwalk, is "destination-type retail" like the Lakefront Brewery. A quality restaurant could likely do well on the site. It is unlikely that the site could support more service retail.

Commercial
There is not a great demand for office space at the present time. The type of development that could work on the site is "build to suit" type development that is constructed to maximize the value of the location on the river. It is anticipated that the floor plates in any development will be small — 4,000 to 5,000 square feet. The majority of commercial and retail activity has been programmed for the west end of the site along Pleasant Street. A second area is located around the base of the Holton Street Bridge. This site includes the ground floor of the Carnahan development, the Forestry Building, and the area immediately to the east of the Holton Street Bridge. A third area is located at the east end of the site adjacent to Humboldt Avenue.

6.2 Preliminary Environmental Evaluation

6.2.1 Process

A preliminary environmental evaluation was completed for this project to assess the environmental conditions of the Beer Line "B", how the environmental conditions of the project site may affect redevelopment opportunities of specific parcels and how the conceptual plans for Beer Line "B" could be integrated with existing environmental challenges to minimize redevelopment costs. The preliminary environmental evaluation consisted of a review of available information for Beer Line "B" and a limited Phase II Investigation. The results of the preliminary environmental evaluation are presented in this section.

The evaluation was initiated by reviewing existing information for the project site. The following informational sources were reviewed.

- "Phase I Environmental Assessment of the Beer Line "B" Project Site" prepared by the City of Milwaukee, dated May 28, 1997
- "Site Investigation and Remedial Action Plan, Forestry Headquarters, 1872 North Commerce Street, Milwaukee, Wisconsin" prepared by Giles Engineering Associates, Inc. and dated March 31, 1997
- "Petroleum-Impacted Soil Removal Monitoring Services Associated with the Former Gasoline UST, Forestry Headquarters, 1872 North Commerce Street, Milwaukee, Wisconsin" prepared by Giles Engineering Associates, Inc. and dated April 10, 1997
- "Site Investigation, Remedial Action Plan and Petroleum Impacted Soil Removal Services (Former Fuel Oil UST), Forestry Headquarters, 1872 North Commerce Street, Milwaukee, Wisconsin" prepared by Giles Engineering Associates, Inc. and dated April 10, 1997
- "Environmental Site Assessment, Former Trostel Tannery" prepared by Geraghty and Miller, Inc. and dated October 28, 1988
- "Detailed Site Evaluation of the Former Trostel and Sons Tannery" prepared by Geraghty and Miller, Inc. and dated January 6, 1989
- "Final Report, Results of Site Investigation Activities, Former Trostel Tannery Site, Milwaukee, Wisconsin" by Jordan, Jones and Goulding, Inc. and dated April 6, 1990
- "Soil and Groundwater Quality Assessment at the Former Trostel Tannery, Milwaukee, Wisconsin" by Chembio Corporation and dated April 1990 (focuses on the current Brewery Works property at the corner of Pleasant Street and Commerce Street).
- "Phase II Environmental Audit/Soil Boring Test Assessment and Groundwater Monitoring Well Assessment" prepared by Braun Intertec and dated March 25, 1991. (focuses on the current Brewery Works property at the corner of Pleasant Street and Commerce Street)
- Several reports prepared by STS Consultants, Ltd., focusing of the Former Trostel Tannery property.
  - "Remedial Investigation Report and Action Plan" dated October 13, 1993 for the Trostel Property prepared by STS Consultants, Ltd.

Site Identification	Past Site Usage Concerns	Potential Contaminants	Additional Sampling Completed	Analytical Testing Completed
Brewery Works (NE Corner of Commerce and Pleasant Streets)	Lumber yard, tannery	Chromium	None additional	None additional
Former Trostel Tannery (1776-1818 Commerce Street)	Tannery	Chromium, DRO, lead	None additional	None additional
Former Gimbels Store (1885 Commerce Street)	USTs	DRO	None additional	None additional
Forestry Building (1872 Commerce Street)	USTs	DRO,GRO, VOCs, metals	None additional	None additional
1980 - 1934 Commerce Street	Coal Storage	PAHs, metals, boron, selenium	None*	None*
1942 Commerce Street	Paving company, coal storage	PAHs, VOCs, metals	2 soil probes groundwater sampling	PAHs, metals, boron, cyanide
2101 - 2113 Humboldt Avenue	USTs, chemical company	PAHs, VOCs, metals	1 soil probe	PAHs, VOCs, metals
200 Walnut Street	Manufacturing, painting	PAHs, VOCs, metals	1 soil probe	PAHs, VOCs, metals, pesticides
2029 - 2057 Commerce Street	Pfister & Vogel hide house	Metals	1 soil probe	Metals
Former Railroad Right-of-Way	Railroad	PAHs, metals	5 soil probes	PAHs, metals, pesticides

PAHs - Polycyclic Aromatic Hydrocarbons
Metals - 8 RCRA metals (total analysis)
VOCs - Volatile Organic Compounds
DRO - Diesel Range Organics
GRO - Gasoline Range Organics
USTs - Underground Storage Tanks

* Could not obtain access permission from Owner

Table 6.2.1 • Sampling Program Summary

- "Practicability Analysis" dated February 11, 1994

for the Trostel Property prepared by STS Consultants, Ltd.

- "Remediation Activities Documentation" dated April 19, 1995 for the Trostel Property by STS Consultants, Ltd.

- "North Shore 9/10 Collector Systems Contracts C96G11 and C96G21" dated January, 1988 for the Milwaukee Metropolitan Sewerage District Deep Tunnel Project.

A limited Phase II scope of work was developed to assess environmental conditions relating to possible soil and groundwater contamination following the review of the above informational sources. The scope of work included drilling fourteen soil probe borings, analytical testing of soil samples, sampling of five temporary wells and analytical testing of groundwater samples. The field investigation scope of work is summarized in Figure 6.2.1.

The locations of the soil borings completed for this project (GP-1 through GP-15, excluding GP-7) are shown on the attached Figures 6.2.9 and 6.2.10. It should be noted that access permission for the purposes of environmental sampling and testing could not be obtained for the parcels at 1890-1934 Commerce Street and 301 Reservoir Avenue (Barrel Plating Service, Inc.). The results of the soil and groundwater analytical testing are summarized on Tables 6.2.2 through 6.2.8.

The following subsections summarize the past site activities on individual parcels; soil and groundwater testing results performed on samples from the sites, if any; and conclusions concerning environmental conditions at the sites. The discussion is referenced by site location as indexed on the Figures 6.2.9 and 6.2.10. Further general discussion is presented in Section 4.9 concerning the management of the issues identified.

Readily available, existing information and limited Phase II investigation results were used to develop our opinions on environmental conditions and risks at the following site locations. A thorough review of existing site information and possibly site-specific soil and groundwater testing may be prudent for all of the sites to address purchaser specific concerns. The scope and magnitude of any site-specific investigation will be dependent on the purchaser's risk tolerance related to the known and potential environmental issues. Additional exploration will be necessary to evaluate management alternatives for the soil and groundwater issues identified by this study.

6.2.2 Individual Property Parcels

The Brewery Works

The site previously contained the Albert Trostel and Sons Company (Trostel) office building which has been razed. No manufacturing processes were believed to occur on this site. Three soil borings for environmental investigation purposes were historically completed on the northern portion of the site and converted to groundwater monitoring wells. Soil and groundwater samples were collected and tested for tannery-related parameters at that time. No additional testing was conducted in conjunction with this Phase II.

	Non-Industrial Direct Contact RCL	GP-1/S-2	GP-2/S-1	GP-3/S-3	GP-4/S-2	GP-5/S-2	GP-6/S-2	G-8/S-3	GP-9/S-2	GP-10/S-2	GP-11/S-2	GP-13/S-1	GP-14/S-1	GP-15/S-2
Sample Depth		2' - 4'	0' - 2'	4' - 6'	2' - 4'	2' - 4'	2' - 4'	4' - 6'	2' - 3'	2' - 4'	2' - 4'	0' - 2'	0' - 2'	2' - 4'
Soil Type		sandy fill/coal	sandy fill	clayey fill	coal fill	clayey fill	sandy fill	clayey fill	sand	limestone fill	coal fill	sandy fill	sand w/cinders	clayey fill
RCRA Metals														
Arsenic	**0.039**	**4.470**	**9.760**	**8.150**	**15.300**	**28.500**	**46.900**	**4.320**	**3.400**	**3.150**	**12.900**	**11.800**	**8.310**	**4.420**
Barium	NE	22.000	79.000	94.000	48.000	131.000	18.000	28.000	16.000	84.000	81.000	84.000	104.000	34.000
Cadmium	**8**	0.190	0.980	0.400	0.400	0.650	0.570	0.160	0.220	0.200	1.500	1.100	0.550	0.160
Chromium	**16000**	7.600	41.000	20.000	11.000	42.000	8.700	8.300	10.000	9.900	18.000	18.000	18.000	9.100
Lead	**50**	14.000	**107.000**	**133.000**	**105.000**	**252.000**	12.000	13.000	5.700	**69.000**	**223.000**	**145.000**	29.000	6.200
Mercury	NE	0.330	0.110	0.330	0.360	0.200	0.097	< 0.087	< 0.083	< 0.087	0.530	0.110	< 0.071	< 0.088
Selenium	NE	< 0.040	0.280	0.230	2.970	4.290	0.860	< 0.040	< 0.040	< 0.040	0.990	0.950	0.170	0.140
Silver	NE	< 0.270	0.350	< 0.300	< 0.290	0.560	< 0.300	< 0.280	< 0.280	< 0.290	< 0.310	< 0.290	< 0.270	< 0.280

All concentrations in mg/kg
Detected parameters shown in bold

RCL - NR 720, Wisconsin Administrative Code Generic Residual Contaminant Level
NE - Not established

Table 6.2.2 • RCRA Metals Soil Analytical Testing

	Non-Industrial Direct Contact RCL	Groundwater Protection RCL	GP-1/S-1	GP-3/S-3	GP-4/S-1	GP-5/S-2	GP-6/S-2	GP-8/S-3	GP-9/S-2	GP-10/S-2	GP-11/S-1	GP-12/S-2	GP-13/S-1	GP-14/S-2	GP-15/S-2
Sample Depth			0' - 2'	4' - 6'	0' - 2'	2' - 4'	2' - 4'	4' - 6'	2' - 3'	2' - 4'	0' - 2'	2' - 4'	0' - 2'	2' - 4'	2' - 4'
Soil Type			sandy fill/coal	clayey fill	gravel	clayey fill	sandy fill	clayey fill	clayey fill	limestone	gravel	sandy fill	sandy fill	sandy fill	sandy fill
PAHs															
anthracene	**5,000,000.000**	**3,000,000.000**	14,900.000	287.000	< 4.800	439.000	179.000	534.000	< 5.100	12.000	120.000	85.000	48.000	< 7.700	< 4.400
benzo(a)anthracene	**88.000**	**17,000.000**	**24,600.000**	**662.000**	< 4.800	**1,190.000**	**602.000**	**180.000**	< 5.100	50.000	< 7.900	**276.000**	**147.000**	**510.000**	< 4.400
benzo(a)pyrene	**9.000**	**48,000.000**	**21,600.000**	**674.000**	< 9.700	**1,150.000**	**939.000**	**1,030.000**	< 10.000	**39.000**	**836.000**	**329.000**	**215.000**	**750.000**	< 8.800
benzo(b)fluoranthene	**88.000**	**360,000.000**	**21,200.000**	**664.000**	< 5.700	**994.000**	**845.000**	**1,000.000**	< 6.000	47.000	**982.000**	**292.000**	**137.000**	**795.000**	< 5.200
benzo(g,h,i)perylene	**1,800.000**	**6,800,000.000**	**8,610.000**	292.000	< 11.000	668.000	587.000	524.000	< 11.000	< 9.800	< 17.000	144.000	< 10.000	852.000	< 9.600
benzo(k)fluoranthene	**880.000**	**870,000.000**	**10,500.000**	242.000	< 11.000	521.000	401.000	470.000	< 11.000	22.000	423.000	130.000	82.000	378.000	< 9.600
chrysene	**8,800.000**	**37,000.000**	**25,200.000**	736.000	< 4.300	1,310.000	948.000	1,120.000	< 4.500	57.000	< 7.000	738.000	109.000	< 8.800	36.000
dibenzo(a,h)anthracene	**9.000**	**38,000.000**	< 12.000	< 13.000	< 12.000	< 13.000	< 12.000	< 16.000	< 13.000	< 11.000	**1,360.000**	**332.000**	**207.000**	< 19.000	< 11.000
fluoranthene	**600,000.000**	**500,000.000**	118,000.000	3,550.000	39.000	5,660.000	2,970.000	4,160.000	< 11.000	196.000	4,060.000	1,030.000	1,070.000	4,250.000	< 9.600
fluorene	**600,000.000**	**100,000.000**	9,270.000	213.000	< 2.600	**290.000**	< 2.700	170.000	< 2.700	< 2.400	< 4.300	< 2.300	< 2.500	< 4.100	< 2.400
indeno(1,2,3-cd)pyrene	**88.000**	**680,000.000**	**5,100.000**	**381.000**	< 5.300	**424.000**	**355.000**	**611.000**	< 5.600	< 4.900	< 8.700	**157.000**	**121.000**	**376.000**	< 4.800
1-metylnaphthalene	**1,100,000.000**	**23,000.000**	< 46.000	< 48.000	< 44.000	< 48.000	< 46.000	< 60.000	< 46.000	< 41.000	< 72.000	< 39.000	87.000	< 70.000	< 40.000
2-methylnaphthalene	**600,000.000**	**20,000.000**	10,800.000	< 46.000	55.000	< 46.000	< 44.000	439.000	< 45.000	< 40.000	< 70.000	< 38.000	1,080.000	< 68.000	< 39.000
phenanthrene	**18,000.000**	**1,800.000**	**59,500.000**	1,690.000	< 5.300	**2,140.000**	843.000	1,450.000	13.000	45.000	825.000	296.000	268.000	1,240.000	< 4.800
pyrene	**500,000.000**	**8,700,000.000**	65,900.000	3,120.000	< 18.000	5,050.000	1,700.000	2,160.000	< 19.000	304.000	1,850.000	590.000	759.000	2,550.000	< 16.000

All concentrations in mg/kg
Detected parameters shown in outline

RCL - NR 720, Wisconsin Administrative C
NE - Not established
PAHs - polycyclic aromatic hydrocarbons

Table 6.2.3 • Polycyclic Aromatic Hydrocarbon Analytical Testing

Fill soil was encountered in the upper portion of the soil profile as indicated on the soil boring logs. The fill soil included some wood chips but no materials which would be considered non-exempt solid wastes according to NR 500, Wisconsin Administrative Code (WAC) were noted. Some tannery-related parameters (chromium compounds in particular) were detected in the soil samples tested, however, the concentrations quantified were below current Generic Non-Industrial Direct Contact NR 720, Wisconsin Administrative Code Residual Contaminant Levels (Direct Contact RCLs). Groundwater had detectable chromium, but at concentrations below the NR 140, WAC Enforcement Standard (ES).

Existing information does not suggest site environmental challenges which would significantly encumber redevelopment of the property. A groundwater use restriction may be proposed for this property. This restriction would not hinder development since the area is served by municipal water and sewer. Thus, the rationale for such a restriction is questionable.

Former Trostel Tannery

A series of environmental investigations and remedial activities have been previously completed to address contamination related to the historical tannery operations at the site. Given the current status of the site, additional Phase II investigation in conjunction with the Beer Line "B" project was not undertaken. The current remediation status of the property is summarized in a letter by STS Consultants to the Wisconsin Department of Natural Resources (WDNR) dated September 28, 1995 and the subsequent WDNR response letter dated February 5, 1996.

Certain tannery-related wastes remain in the area of the former tannery buildings, particularly at the lowest levels of the former buildings present on the site. (These areas are now overlain by six feet of construction demolition materials). An agreement with WDNR to limit excavation for development in the central portion of the site, as shown on the attached Figure 6.2.11, has been made. Additional site redevelopment challenges are presented by a 25 foot wide limited development zone along the Milwaukee River and the southern property line (limiting the construction of permanent features which would preclude future possible excavation in this area) and an area of lead-affected soil in the northern portion of the site which will require a direct-contact barrier with the existing soil. Specific site development plans addressing these environmental issues will need to be submitted to the WDNR for approval during the planning process to assure compliance with environmental regulations.

Existing information identifies current environmentally-related restrictions of redevelopment at the site. These restrictions may affect site and building layout and structural support selection, but do not preclude development. Deed restrictions and groundwater use restriction will likely be required under the current redevelopment restrictions imposed by WDNR. These restrictions assume no further remediation of soil and/or groundwater for redevelopment, except for proper management of soils encountered during construction. Potential future liability associated with site ownership may exist and needs to be addressed by

	Groundwater Protection Generic RCL	GP-2/S-3	GP-4/S-1	GP-8/S-8	GP-10/S-2	GP-12/S-5	GP-14/S-3
Sample Depth		4' - 6'	0' - 2'	14' - 16'	2' - 4'	8' - 10'	4' - 6'
Soil Type		Coal fill	Gravel	Fill - PID reading	Limestone	Clayey fill	Sandy fill
VOCs							
ethylbenzene	2,900.000	46.000	< 4.500	< 4.500	< 4.500	< 4.500	< 4.500
naphthalene	NE	160.000	< 7.100	< 7.100	38.000	< 7.100	< 7.100
styrene	NE	< 15.000	< 15.000	< 15.000	67.000	< 15.000	< 15.000
toluene	1,500.000	148.000	< 4.200	< 4.200	< 4.200	< 4.200	< 4.200
1,2,4-trimethylbenzene	NE	67.000	< 9.900	< 9.900	< 9.900	< 9.900	< 9.900
1,3,5-trimethylbenzene	NE	26.000	< 10.000	< 10.000	< 10.000	< 10.000	< 10.000
m&p xylene	4,100.000	158.000	< 19.000	< 19.000	< 19.000	< 19.000	< 19.000
o-xylene	*	72.000	< 9.000	< 9.000	< 9.000	< 9.000	< 9.000

All concentrations in mg/kg
Only detected parameters shown

RCL - NR 720, Wisconsin Administrative Code Generic Residual Contaminant Level
NE - Not established
VOCs - volatile organic compounds by EPA method 8021
* - RCL for summation of m&p xylene and o-xylene

Table 6.2.4 • Volatile Organic Compounds Analytical Testing

a potential purchaser.

Former Gimbel's Store

This site is currently under redevelopment by the property owner and, as such, no Phase II work was completed by STS. Existing information does not suggest environmental challenges which would significantly encumber additional redevelopment of the property.

City Forestry Building

Subsurface soil and groundwater investigation activities have been completed at the subject site to explore environmental issues associated with two former underground storage tanks (gasoline and fuel oil). Impacts associated with the fuel oil tank were apparently remediated by excavating approximately 12 tons of petroleum-affected soil. Closure from the WDNR has been requested for the fuel oil tank. Benzo(a)pyrene above a direct contact RCL remains in soil from this area of the site, however, dermal contact is apparently prevented by the overlying soil.

The extent of soil contamination associated with the former gasoline tank has been defined and remediated according to Giles Engineering. Delineation of the extent of groundwater contamination from the tank is also on-going.

As a result of the previous site investigation activities, low-level metals contamination of soil and groundwater with selenium, chromium and arsenic has been identified. Further resolution of the magnitude and extent of metals-affected soil is being pursued by the City of Milwaukee, the property owner. A Phase II investigation was not completed on this site for the Beer Line "B" project.

Environmental challenges at the site have been resolved. The site has been sold to the Lakefront Brewery and has been redeveloped as a micro-brewery.

1890-1934 Commerce Street

This area of Beer Line "B" was historically used by several fuel companies for storing coal. The historical storage of coal on the site could result in residual impacts to soil and groundwater on-site (i.e., PAHs, boron, metals and/or cyanide). Access to the site for soil sampling associated with this project was denied by the site owner and, as a result, no site-specific analytical testing data is available. The environmental risk associated with this site is therefore, undefined at this time.

There were, however, several borings completed on the property for the Deep Tunnel Project and soil boring logs were reviewed to aid in assessing possible soil conditions at the site. The soil boring information identified fill on the site consisting of natural soil material (i.e., clay, sand, etc.) and cinders. The fill thickness ranged between 0 feet and 14 feet with an average thickness of approximately 8 feet. Cinders were identified at times in distinct layers up to 4 feet thick

and also mixed with natural fill soil. Cinders are considered non-exempt solid waste under NR 500, WAC; and, as such, (under current regulations) would require "an exemption to NR 500, WAC to construct on an abandoned landfill" if left in-place. If removed, the cinders would need to be characterized and a Materials Handling Plan prepared.

The presence of cinders on the site in combination with the undefined environmental risk present a redevelopment challenge. The incremental cost of redevelopment associated with environmental issues at this site could range over several orders of magnitude and are, therefore, a critical aspect of any economic evaluation of redevelopment opportunities.

If the cinders are left in-place, the site could remain on a registry of abandoned landfills in the state. The current Purchaser Protection Program (Act 453 of Wisconsin State Statutes) applies to "spill law" sites, and has not been broadened to include abandoned landfill (i.e., NR 500, WAC) sites. There may be, therefore, potential future liability associated with site ownership at this time. The WDNR and interested parties are currently looking at ways to extend Purchaser Protection to "Brownfields" site where widespread non-natural fill materials (i.e., foundry sand, ash, etc.) are present.

1942 Commerce Street

The property was historically used by fuel companies, a trucking terminal, a paving company and for coal storage, according to historical information presented by the City of Milwaukee Phase I Environmental Assessment Report. In addition, a historical soil boring completed in Commerce Street west of the site in 1985 identified a petroleum odor in the soil at approximately 10 feet below grade.

Two soil probes (GP-2 and GP-3) were completed on this parcel for this Phase II and a groundwater sample was collected. Analytical soil testing was completed for metals, cyanide, boron and PAHs and groundwater was tested for metals (See Tables 6.2.2 and 6.2.3). Fill soil including coal was encountered at the soil probe locations to a depth of 10 feet below grade. Coal may be considered a non-exempt solid waste under NR 500, WAC (see discussion of non-exempt solid waste fill sites under Section 6.2.5). Low levels of cyanide and boron were detected in fill soil. Metals and PAHs were quantified in the fill soil above non-industrial direct contact RCLs. VOCs were quantified in soil from GP-2,

VOCs	ES	PAL	GP-8	GP-12	Trip Blank
sec-butylbenzene	NE	NE	**6.400**	< 0.200	< 0.200
tert-butylbenzene	NE	NE	**0.800**	< 0.400	< 0.400
ethylbenzene	**700.000**	**140.000**	**0.400**	< 0.200	< 0.200
isopropylbenzene	NE	NE	**0.600**	< 0.200	< 0.200
p-isopropyltoluene	NE	NE	**8.700**	< 0.300	< 0.300
naphthlane	**100.000**	**20.000**	**0.900**	< 0.500	< 0.500
n-propylbenzene	NE	NE	**1.200**	< 0.200	< 0.200
toluene	**343.000**	**68.600**	**2.200**	0.500	< 0.400

All concentrations in ug/l
Detected parameters shown in bold
Only detected parameters shown

33 - ES Exceedance
22 - PAL Exceedance

ES - NR 140, Wisconsin Administrative Code Enforcement Standard
PAL - NR 140, Wisconsin Administrative Code Preventive Action Limit
NE - Not established

Table 6.2.5 • VOCs Groundwater Analytical Testing

but were below groundwater protection-based RCLs. The detection of VOCs may be related to the petroleum odors noted on the 1985 soil boring log. No metals were quantified in the groundwater sample from GP-3 above NR 140, Wisconsin Administrative Code regulatory limits. The absence of groundwater exceedances for metals suggests that the affected soils may be able to be managed on-site using WDNR performance-based closure guidance, rather than in-situ or ex-situ treatment and/or disposal. A performance-based closure could result in a deed restriction and/or engineering controls (i.e., barrier) to prevent direct contact with affected soils.

Existing information identifies environmental challenges at the site which may encumber, but not prevent, redevelopment of the property and may affect potential future liability associated with site ownership.

2000-2056 Commerce Street

The property was historically used by fuel companies, a paving company and for coal storage, according to historical information presented by the City of Milwaukee Phase I Environmental Assessment Report. Four soil probes (GP-4, 5, 6 and 8) were completed on this parcel and groundwater samples (GP-5, 6 and 8) were collected from three locations. Analytical soil testing was completed for metals , cyanide, boron and PAHs and groundwater was tested for metals (See Tables 6.2.2 and 6.2.3).

Fill soil including coal was encountered at the soil probe locations. Coal may be considered a non-exempt solid waste under NR 500, WAC (see discussion of non-exempt solid waste fill sites under Section 6.2.5). Low levels of cyanide and boron were detected in fill soil. Metals and PAHs were quantified above direct contact RCLs. Lead and arsenic were quantified in one

groundwater sample above the NR 140, WAC PAL, but below the ES (Table 6.2.7). VOCs were also quantified in one groundwater sample, but all parameters detected were below NR 140, WAC regulatory limits. VOCs were not quantified in soil in the two soil samples tested.

The occurrence of lead and arsenic above direct contact RCLs in soil in combination with the presence of these elements above groundwater standards on this parcel suggests that additional evaluation will be necessary on this site in order to determine what remediation, if any, may be necessary.

Existing information identifies environmental challenges at the site which may encumber, but not prevent, redevelopment of the property and may affect potential future liability associated with site ownership. A performance-based closure could result in a deed restriction and/or engineering controls (i.e., barriers) to prevent direct contact with affected soils. Remediation may also be necessary.

2101-2113 North Humboldt Avenue

Past uses of the property were identified as a "lime house" and the National Analine & and Chemical Company. One soil probe (GP-10) was completed on this parcel. The soil was tested for metals, VOCs, and PAHs. (see tables 6.2.2 through 6.2.4) The analytical testing for soil quantified metals and benzo(a)pyrene above direct contact RCLs. VOCs were detected in soil, but below groundwater protection RCLs. Groundwater was not tested on the parcel.

Existing information identifies environmental challenges at the site which may encumber, but not prevent, redevelopment of the property. See Section 4.9.2 for further discussion of these issues.

200 Walnut Street

This area was formerly occupied by Badger Sash and Door Co. and various other businesses. One soil probe (GP-14) was completed in this area and a soil sample was tested for metals, PAHs, VOCs and pesticides (Tables 6.2.2, 6.2.4, and 6.2.6). The soil encountered in this area included some slag and cinders. Slag and cinders are considered non-exempt solid wastes under NR 500, WAC. Arsenic and several PAHs were quantified above direct contact RCLs. VOCs and pesticides were not detected.

Existing information identifies environmental challenges at the site associated with managing fill soil which may encumber redevelopment of the property and may affect potential future liability associated with site ownership. See Section 4.5.2 for further discussion of these issues.

Sample Depth	0' - 2'	2' - 4'
Soil Type	clayey fill	sandy fill
Pesticides		
EPTC	< 4.200	< 4.200
butylate	< 5.200	< 5.200
trifluralin	< 3.700	< 3.700
propachlor	< 4.500	< 4.500
diamino atrazine	< 7.900	< 7.900
atrazine desethyl	< 5.300	< 5.300
atrazine desisopropyl	< 5.500	< 5.500
prometon	< 3.800	< 3.800
propazone	< 5.000	< 5.000
atrazine	< 5.100	< 5.100
simazine	< 5.200	< 5.200
atrazine	< 5.800	< 5.800
alachlor	< 5.800	< 5.800
metribuzin	< 6.800	< 6.800
metolachlor	< 13.000	< 13.000
pendimethalin	< 4.900	< 4.900
cyanazine	< 5.300	< 5.300
anilazine	< 7.500	< 7.500
napropamide	< 4.200	< 4.200
velpar	< 7.100	< 7.100

All concentrations in ug/kg

Table 6.2.6 • Soil Pesticide Testing

2029-2057 Commerce Street

A tannery "hide house" was historically present on this parcel and one probe (GP-9) was completed on this parcel. Soil was tested for metals and PAHs (Table 6.2.3). Arsenic was quantified above direct contact RCLs, but within a typical background level range observed in Wisconsin. No PAHs above direct contact RCLs were quantified.

Existing information from one boring identifies minimal environmental challenges at the site which may

RCRA Metals	ES	PAL	GP-1	GP-3	GP-5	GP-6	GP-8	GP-12
Arsenic	**50.000**	**5.000**	**1.000**	< 1.000	< 1.000	< 1.000	**5.000**	< 1.000
Barium	**2,000.000**	**0.400**	**122.000**	**26.000**	**22.000**	**19.000**	**237.000**	**294.000**
Cadmium	**5.000**	**0.500**	< 0.500	**0.200**	< 0.100	**0.300**	< 0.100	**0.300**
Chromium	**100.000**	**10.000**	< 0.400	< 0.400	< 0.400	0.800	**3.600**	**0.600**
Lead	**15.000**	**1.500**	< 1.000	< 1.000	< 1.000	< 1.000	**3.000**	**6.000**
Mercury	**2.000**	**0.200**	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200
Selenium	**50.000**	**10.000**	**0.800**	**3.000**	< 0.800	< 0.800	< 0.800	< 0.800
Silver	**50.000**	**10.000**	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400

All concentrations in ug/l
Detected parameters shown in bold

ES - NR 140, Wisconsin Administrative Code Enforcement Standard
PAL - NR 140, Wisconsin Administrative Code Preventive Action Limit

Table 6.2.7 • RCRA Metals Groundwater Analytical Testing

encumber redevelopment of the property.

Former Railroad Right-of-Way

This area was used as railroad right-of-way from the 1800's until the 1960's and has been fallow since this time. Concerns along the former railroad right-of-way relate to possible spillage or leakage from the railroad activities on the property. Soil probes GP-1, GP-11, GP-12, GP-13 and GP-15 were completed in this area. Soil samples were tested for RCRA metals, PAHs, VOCs, and pesticides (Tables 6.2.2 and 6.2.6). Groundwater samples were collected from temporary wells and tested for RCRA metals and VOCs (one only) (Tables 6.2.2, 6.2.4, 6.2.5, 6.2.6, and 6.2.7.).

Metals and PAHs were quantified above direct contact RCLs. VOCs were not quantified in soil in the one soil sample tested. Lead was quantified in the groundwater sample above the NR 140, WAC PAL. VOCs were not quantified in the groundwater sample. No pesticides were quantified in the soil sample. The absence of groundwater ES exceedances for metals suggests that the affected soils may be able to be managed on-site using WDNR performance-based closure guidance rather than in-situ or ex-situ treatment and/or disposal. A performance-based closure could result in a deed restriction and/or engineering control (i.e., barrier) to prevent direct contact with affected soils.

Existing information identifies environmental challenges at the site which may encumber, but not prevent, redevelopment of the property and may effect potential future liability associated with site ownership.

6.3 Existing Geotechnical Conditions

6.3.1 General Geology

The study area is situated along the western banks of the Milwaukee River Valley. The earth materials consist of Quaternary deposits of fill, post-glacial and glacial soils overlying Devonian age bedrock.

Valley Fill - Fill soil and materials cover nearly all of the study area. Within the low area along Commerce Street from the edge of the bluffs to the river, the fill was placed over once lower marshy river and estuarine deposits and over former paths of the river and a canal called the Rock River Canal. The approximate location of the former river bank, canal and estuarine/river valley deposits is shown on Figures 6.3.2 and 6.3.3. The fill soils consist of a mixture of clay, silt, sand and gravel with varying amounts of cinders, coal, building demolition debris and other materials. Fill deposits in the low area generally range from a few feet to over 20 feet in thickness and typically are in the range of 10 to 15 feet in thickness.

Bluff Fill - Fill deposits also cover much of the bluff area. The bluff fills are mostly associated with construction of railroad benches and roadways. The bluff is terraced from construction of benches and retaining walls. Fills were placed behind the retaining walls. Available data indicates that most of the fill is silty clay that is likely reworked glacial till. Fill deposits in the bluff area generally range from a few feet to 20 feet in thickness.

	GP-2/S-1	GP-2/S-3	GP-3/S-2	GP-3/S-3	GP-5/S-1	GP-5/S-2	GP-6/S-1	GP-6/S-2
Sample Depth	0' - 2'	4' - 6'	2' - 4'	4' - 6'	0' - 2'	2' - 4'	0' - 2'	2' - 4'
Soil Type	sandy fill/coal	coal	clayey fill	clayey fill	clayey fill	clayey fill	sandy fill	sandy fill
Total Cyanide	–	0.020	0.050	–	0.050	–	< 0.200	–
Total Boron	15.000	–	–	12.000	–	6.700	–	4.200

– not tested

Table 6.2.8 • Boron and Cyanide Soil Analytical Testing

Valley Post-Glacial Soils - In the low area, the fill is underlain by post-glacial soils and glacial soils. The post-glacial soils generally consists of estuarine deposits and alluvial deposits. The estuarine deposits are soft to stiff organic silts and clays that were once marshy backwater soils. The estuarine deposits typically range in thickness from 1 to 10 feet. The estuarine deposits are adjacent to and underlain by alluvial deposits consisting of loose to medium dense silty sand and gravel. Between Commerce Street and the river dockwall, the post-glacial deposits generally extend to depths in the range of 20 to 30 feet.

Valley Glacial Soils - The post-glacial soils are underlain by predominantly cohesive glacial soils. The glacial soils consist mostly of very stiff to hard silty clay till. The tills are occasionally interbedded with lacustrine silt and clay deposits and outwash sand and gravel deposits. The glacial soils extend to bedrock. In the low area, bedrock depth generally varies from 50 to 65 feet.

Bluff Glacial Soils - The bluff fill deposits are underlain by predominantly cohesive glacial soils. The glacial soils consist mostly of very stiff to hard silty clay till. The tills are occasionally interbedded with lacustrine silt and clay deposits and outwash sand and gravel deposits. The glacial soils extend to bedrock. Along the top of the bluff, bedrock depth generally varies from 100 to130 feet.

Bedrock - Bedrock in the study area consists of Devonian age rock called the Milwaukee Formation and Thiensville Formation. The Milwaukee Formation is a predominantly dolomite with frequent argillaceous layers. The Milwaukee Formation ranges in thickness from 20 to 50 feet and is typically found within an elevation range of -40 to -90 feet, Milwaukee City Datum. The Thiensville Formation underlies the Milwaukee Formation. It has a thickness in the range of 65 to 75 feet and is typically found within an elevation range of -150 to -170 feet, Milwaukee City Datum.

6.3.2 Soil and Groundwater Conditions

Soil conditions in the study area were assessed using the general geologic information that was previously discussed and using available boring logs. Approximately 90 boring logs were found and are located as shown in Figures 6.3.4 and 6.3.5. The borings are not attached to this report, but may be found attached to a June 25, 1995 letter report addressed to Mr. Mike Wisniewski of the City of Milwaukee.

The soil conditions in the study area can be generalized into three zones. The approximate boundaries of these zones are shown in Figures 6.3.4 and 6.3.5. Zone A soils border the river along most of the study area. Zone B soils are found along Commerce Street and along the river towards Humboldt Avenue. Zone C soils are bluff soils which are located west of Commerce Street.

I. Zones

Zone A Soils

Zone A soils generally consist of loose, miscellaneous fill overlying relatively compressible organic silt and clay, and then loose to medium dense sand. These soils are generally found along the river dockwall and extend part or all of the way to Commerce Street. Zone A soils are considered relatively compressible and generally unsuitable for support of the proposed development structures on shallow foundations unless suitable ground improvement is performed. The Zone A soils typically consist of the following general strata:

- **Fill** Fill in this zone generally consists of a mixture of cohesive soil (silt and clay) , granular soil (sand and gravel) and rubble fill (building debris, rubble, pavement chunks, etc.). The fill consistency and density varies from soft to hard and from loose to dense. The majority of the fill is considered to be in a loose or soft condition and is therefore, moderately compressible. The fill deposits generally range from a

RefNo	Structure Description	Foundation Description	Structure/Foundation Status
1	Pleasant St. Bridge, City of Milwaukee	Piles, type unknown	In active use
2	Tarp Covered Concrete Bin	Unknown, probably shallow spread footings	In active use
3	NS-8 Junction Chamber, Trash Rack, Odor Control Building, Approach Channel, Vent Shaft and Drop Shaft, MMSD	Deep mat footings bearing on glacial tills, all structures are underground except Odor Control Building	In active use
4	Former Trostel and Sons Tannery, 1776 N. Commerce St., 8&12 stories	Piles, type unknown	Building was demolished after 1990, pile caps and piles were abandoned and buried.
5	Former Trostel and Sons Tannery Warehouse, 1818 N. Commerce St. 1 story		Building was demolished after 1990. Foundations were not removed.
6	Former Gimbel's warehouse, presently under renovation to be a residential building, 1858 N. Commerce St., 8 stories	Probably piles or drilled shafts, type unknown	Building along river in active use-being renovated.
7	Former Gimbel's warehouse buildings along Commerce St., presently being demolished to make parking space, 1858 N. Commerce St.	Probably piles	Demolished, foundations left in place.
8	Former City of Milwaukee Forestry Building, 1872 N. Commerce, 3-1/2 stories	Piles, type unknown	Inactive, but still standing
9	Holton St. Viaduct	Piles, type unknown	In active use
10	NS-7 Junction Chamber, Trash Rack, Odor Control Building, Approach Channel, Vent Shaft and Drop Shaft, MMSD	Deep mat footings bearing on glacial tills, all structures are underground except Odor Control Building	In active use
11	Rowing Club Building, 2000 N. Commerce, 1 story	Probably shallow spread footings	In active use
12	Detention Tank/Demonstration Treatment Plant, 2050 N. Commerce St., Underground and 1&2 Stories	Tank on mat foundations, buildings probably on spread footings	Abandoned after 1990, extent of foundation removal unknown.
13	Ace Services Building, 2062 N. Commerce St., 1 story	30" diameter drilled shafts	In active use
14	Johnson Products Co. Inc., 2072 N. Commerce St., 1 story	30" diameter drilled shafts	In active use
15	Former Wiesel Sausage Plant, 2113 N. Humboldt Ave., 1 & 2-1/2 stories	Probably shallow spread footings	Demolished since 1990, status of foundation removal unknown
16	MMSD Humboldt Access Shaft and Odor Control Structure	Shaft extends 300 feet deep and into rock, odor control building is founded on shallow spread footings	In active use
17	Humboldt Bridge over Commerce St.	Concrete retaining wall on spread footings	In active use
18	Humboldt Ave. Bridge over Milwaukee River	Probably on piles	In active use

Table 6.3.1 • Summary of Previous and Existing Structure Foundation Information • See Figures 6.3.6 and 6.3.7

few feet to over 20 feet in thickness and typically are in the range of 10 to 15 feet in thickness.

- **Estuarine Deposits** The Estuarine Deposits consist of organic silt and clay that are the former river valley marsh soils. The estuarine deposits typically range in thickness from 1 to 10 feet. The estuarine soils generally have a consistency ranging from soft to stiff and are moderately to highly compressible. Decay of the organic material in these soils is a known source of methane gas. Methane gas may be trapped in granular pockets within or below the layer and may also be dissolved in the surrounding groundwater.

- **Alluvial Deposits** The Alluvial Deposits consist of silty sand and gravel that formed in a flowing river environment. The density of the Alluvial Deposits typically ranges from loose to medium dense with a tendency to increase in density with depth. The Alluvial Deposits generally range in thickness from a few feet to over 20 feet with the thicker deposits found towards the southern end of Zone A. The Alluvial Deposits are considered to have low to moderate compressibility. Portions of the alluvial soils may be suitable for support of light to moderately loaded structures

- **Glacial Deposits** The Glacial Deposits generally consist of silty clay and clayey silt that has a very stiff to hard consistency. The till has a low relative compressibility and generally would be a suitable foundation subgrade for buildings of the type being proposed. The glacial tills are typically 20 to 30 feet thick in Zone A and are found below a depth of approximately 20 to 30 feet.

Zone B Soils

Zone B soils generally consist of loose to medium dense granular fill or medium to hard cohesive soil overlying glacial till. A significant difference with Zone A soils is that Zone B soils do not include the moderately to highly compressible estuarine deposits. These soils are generally found along Commerce Street. Zone B soils are considered to have low to moderate compressibility. They are generally unsuitable for support of the proposed development structures on shallow foundations unless suitable ground improvement is performed. The Zone B soils typically consist of the following general strata:

- **Fill** Fill in this zone generally consists of a mixture of cohesive soil (silt and clay) , granular soil (sand and gravel) and rubble fill (building debris, rubble, pavement chunks, etc.). The fill consistency or density varies from soft to hard and from loose to dense. The majority of the fill is considered to be in a loose or soft condition and is therefore, moderately compressible. The fill deposits generally range from a few feet to over 20 feet in thickness and typically are in the range of 10 to 15 feet in thickness.

- **Alluvial Deposits** The Alluvial Deposits consist of silty sand and gravel that formed in a flowing river environment. The density of the Alluvial Deposits typically ranges from loose to medium dense with a tendency to increase in density with depth. The Alluvial Deposits generally range in thickness from a few feet to over 20 feet with the thicker deposits found towards the southern end of Zone B. The Alluvial Deposits are considered to have low to moderate compressibility. Portions of the alluvial soils may be suitable for support of light to moderately loaded structures.

- **Glacial Deposits** The Glacial Deposits generally consist of silty clay and clayey silt that has a very stiff to hard consistency. The till has a low relative compressibility and generally would be a suitable foundation subgrade for buildings of the type being proposed. The glacial tills are typically 20 to 40 feet thick in Zone B and are found below a depth of approximately 10 to 20 feet.

Zone C Soils

Zone C soils generally consist of very stiff to hard cohesive fill overlying cohesive glacial till. A significant difference with Zone A and B soils is that Zone C soils do not include the moderately to highly compressible estuarine deposits or the low to moderately compressible alluvial deposits. In addition, the fill tends to be harder and has much less rubble content. These soils are generally found along the bluff. Zone C soils are considered to have low to moderate compressibility. They may be suitable for support of the proposed development structures on shallow foundations if constructed in a manner that preserves slope stability. The Zone C soils typically consist of the following general strata:

- **Fill** Fill in this zone generally consists of cohesive soil (silt and clay) with a lessor amount of granular soil (sand and gravel) and only a trace or small

pockets of rubble fill (building debris, rubble, pavement chunks, slag etc.). The fill consistency generally varies from very stiff to hard. The fill deposits generally range from a few feet to over 15 feet in thickness and typically are in the range of 5 to 10 feet in thickness.

- **Glacial Deposits** The Glacial Deposits generally consist of silty clay and clayey silt that has a very stiff to hard consistency. The till has a relatively low compressibility and would generally be a suitable foundation subgrade for buildings of the type being proposed, provided that bluff and retaining wall stability is maintained. The glacial tills are typically 70 to 110 feet thick in Zone C and are found below a depth of approximately 5 to 15 feet.

II. Groundwater

Zone A and B Groundwater Conditions

The groundwater table within the valley areas of Zones A and B is typically found at and within a few feet above the Milwaukee River level. The water levels are based on the large number of borings and wells that exist or once existed in this area. Generally a slight horizontal gradient towards the river is present. Water levels in this area are likely to fluctuate with river level fluctuations. The Zone A and B fill and alluvial deposits generally have a moderate to high permeability, therefore may yield moderate to high inflow rates within excavations below the water table unless a cutoff wall or groundwater isolation barrier is constructed.

Progressively lower groundwater levels are present within the glacial and bedrock aquifers in this area. These lower levels are mostly caused by infiltration into the Milwaukee Metropolitan Sewerage District's Northshore Interceptor deep tunnel.

Zone C Groundwater Conditions

The groundwater table within the bluff areas of Zones A and B is estimated to range from near the ground surface at some steeply sloped areas (a spring) to over 20 feet deep along the crown of the bluff and along some of the bluff benches. Very few borings and wells are available for this area, therefore the bluff water table level has considerable uncertainty. Generally, the groundwater table is expected to slope downward along the bluff and towards the river. The Zone C fill and pockets of granular soil or outwash interbedded with the glacial till deposits have the highest permeability and may yield inflows into excavations that require pumping. However, in general, the Zone C soils have a relatively low permeability and are not expected to yield large quantities of water into excavations of the type expected for the proposed development.

6.3.3 Previous and Existing Foundations, Excavations, and Underground Structures

Previous Canal and River Bank

Based on various historical references, a canal was dug through the study area in the late 1830's. The canal was to have extended to the Rock River, but the project was abandoned after reaching approximately West McKinley Ave. The approximate locations of the former Rock River Canal and Milwaukee river banks area based on old City plans shown on Figures 6.3.2 and 6.3.3. After the canal was partially completed, grist and flour mills, foundries and factories were constructed along its banks. In the study area, most of these buildings were located east of the canal. In 1884, the canal was filled and paved to become Commerce Street. The significance of the canal location for new development is the fill material that was placed in it and the former materials that lined the bank. Available boring logs located in the canal area suggest that it was mostly filled with silts and clays, a lessor amount of sand and gravel, and to some extent with cinders, slag and other waste materials. These materials were apparently not compacted. Borings located over the former canal alignment generally indicate that most of the canal backfill is a loose or soft state and therefore is relatively compressible.

Figures 6.3.2 and 6.3.3 also show that the former Milwaukee river bank was located a few feet to a few tens of feet northwest of its present dockwall location. One portion of the old river bank was encountered in 1988 when an excavation was being completed for the MMSD NS-7 Approach Channel. Boulders were found at depths ranging from 10 to 15 feet deep along what appeared to be the former river bank. They had apparently been used for bank rip rap. Buried boulder rip rap may also be present at other former river bank locations in the study area.

Previous and Existing Structure Foundations

Available records on previous and existing structure foundations in the study area were reviewed. The

locations of these structures are shown on Figures 6.3.6 and 6.3.7. A summary of available information is listed in Table 6.3.1. Note that these figures and tables do not contain information on many much older structures that once existed in the area. Information on much older structures may be found in a May 28, 1997 document entitled "Phase I Environmental Assessment of the "Beer Line B" Project Site, Milwaukee, Wisconsin" that was prepared by the City of Milwaukee. The type of foundation and extent of foundation abandonment for most of the older structures are unknown. We believe that at least some of the much older structures were founded on timber piles. Scattered zones of abandoned timber piles and pile caps are likely throughout the area between Commerce Street and the river.

Table 6.3.1 shows that most of the listed buildings and bridges are founded on piles or drilled shafts. Deep foundations were the generally adopted foundation solution for the type of structures that exist or previously existed in soil Zones A and B.

Table 6.3.1 also indicates that abandoned foundations are likely to exist at the former Trostel Tannery building (Ref. No. 7) and at the former warehouse building (Ref. No. 8). Available information indicates that the Trostel building foundations were not abandoned with superstructure demolition. Basement and excavated areas were apparently filled with building rubble and then leveled. The rubble and buried foundations will be an impediment to future development in these areas.

Additional sources of underground obstructions in the are between Commerce Street and the river are the river dockwall and retainage system and the existing retaining walls. Portions of the dockwall are tied-back to anchor piles. These piles are typically located 20 to 40 feet behind the dockwall. A more detailed discussion of dockwall conditions is presented in Section 3.4. Retaining walls are discussed below.

Retaining Walls

Numerous retaining walls exist in the study area. Most of them are located in the bluff area west of Commerce Street. A lesser number are located between Commerce Street and the River. The bluff area retaining walls were constructed to form benches in the bluff for railroad tracks or to allow roadway construction along the bluff.

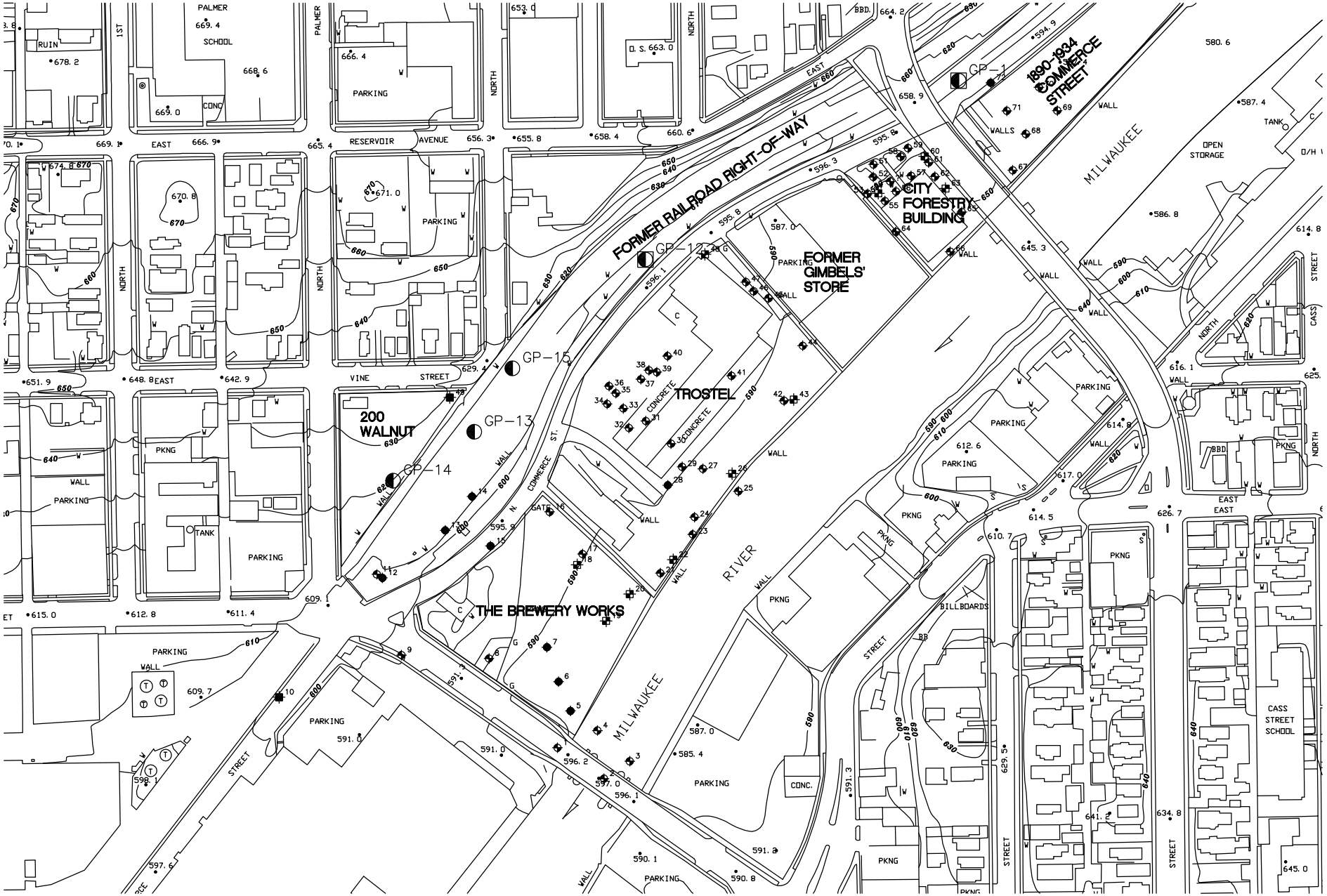
A complete summary of the known retaining walls in the study area is contained in a July 1990 report by HNTB Corporation that is entitled "Beer Line "B" Site Study - Report on Training Walls, Dockwall and Roadways within the Study Site." The report shows retaining wall locations and lists retaining wall material types, lengths, and retained soil heights. The physical conditions which could be observed are described. Recommendations on continued use, repair or replacement were made.

The 1990 Study did not obtain drawings showing wall types and did not assess retaining wall stability except for obvious movements or signs of distress. We were able to obtain additional information on some of these walls. One of the longest walls, 1,750 feet, called Retaining Wall G appears to have been constructed in the late 1940's in association with construction of the Holton Street Viaduct. City of Milwaukee record drawings for portions of the retaining wall were found. These drawings show that the wall is a cantilevered, reinforced concrete wall that is founded on relatively shallow strip footings. The HNTB report indicate that this wall is in "satisfactory" conditions and exhibited no signs of movement or instability. The City of Milwaukee drawings show that the wall was designed with appropriate safety factors for resisting earth forces and railroad track surcharge loads. This information could be used to assess possible new development on the benches above and below it.

Plan sheets were not found for the other retaining walls. Records on some of these walls may exist in archived files of the railroad company which formerly owned the land, but would be very difficult to locate. Based on the information in the HNTB report, the referenced City of Milwaukee plans and our own visual observations we estimate that the other concrete retaining walls are generally gravity and/or footing supported structures. We found no evidence of tie-rod or anchor systems behind the concrete walls.

The steel retaining walls appear to be cantilevered sheet pile walls. No signs of tie-rods or anchor systems were found. Depths of the sheetpiles are not known, but can be determined by non-destructive, geophysical testing. Sheetpile section size may be determined by measuring sheet dimensions and thickness. With sheetpile section and length information, reuse of sheets to retain deeper cuts or new development surcharge loads can be assessed.

The HNTB report identifies retaining walls which are in



SOIL PROBE\TEMPORARY WELL LOCATION DIAGRAM
BEER LINE "B" DEVELOPMENT
MILWAUKEE, WISCONSIN

LEGEND

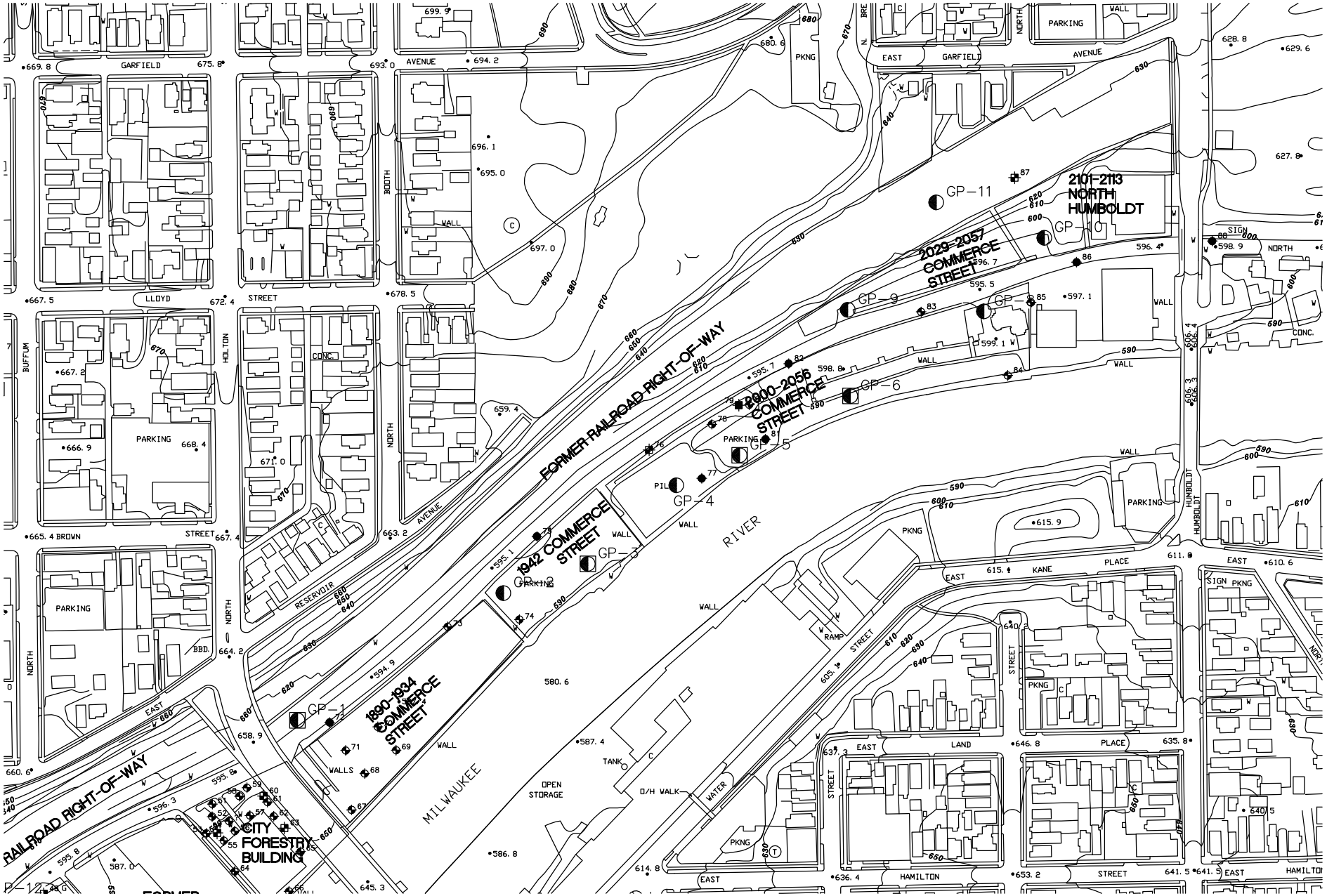
GP-4 ◐ **SOIL PROBE LOCATION**

GP-6 ◧ **SOIL PROBE LOCATION WITH TEMPORARY WELL**

SCALE IN FEET
0 200'

85258

FIGURE 6.2.9



SOIL PROBE\TEMPORARY WELL LOCATION DIAGRAM
BEER LINE "B" DEVELOPMENT
MILWAUKEE, WISCONSIN

LEGEND

GP-4 SOIL PROBE LOCATION

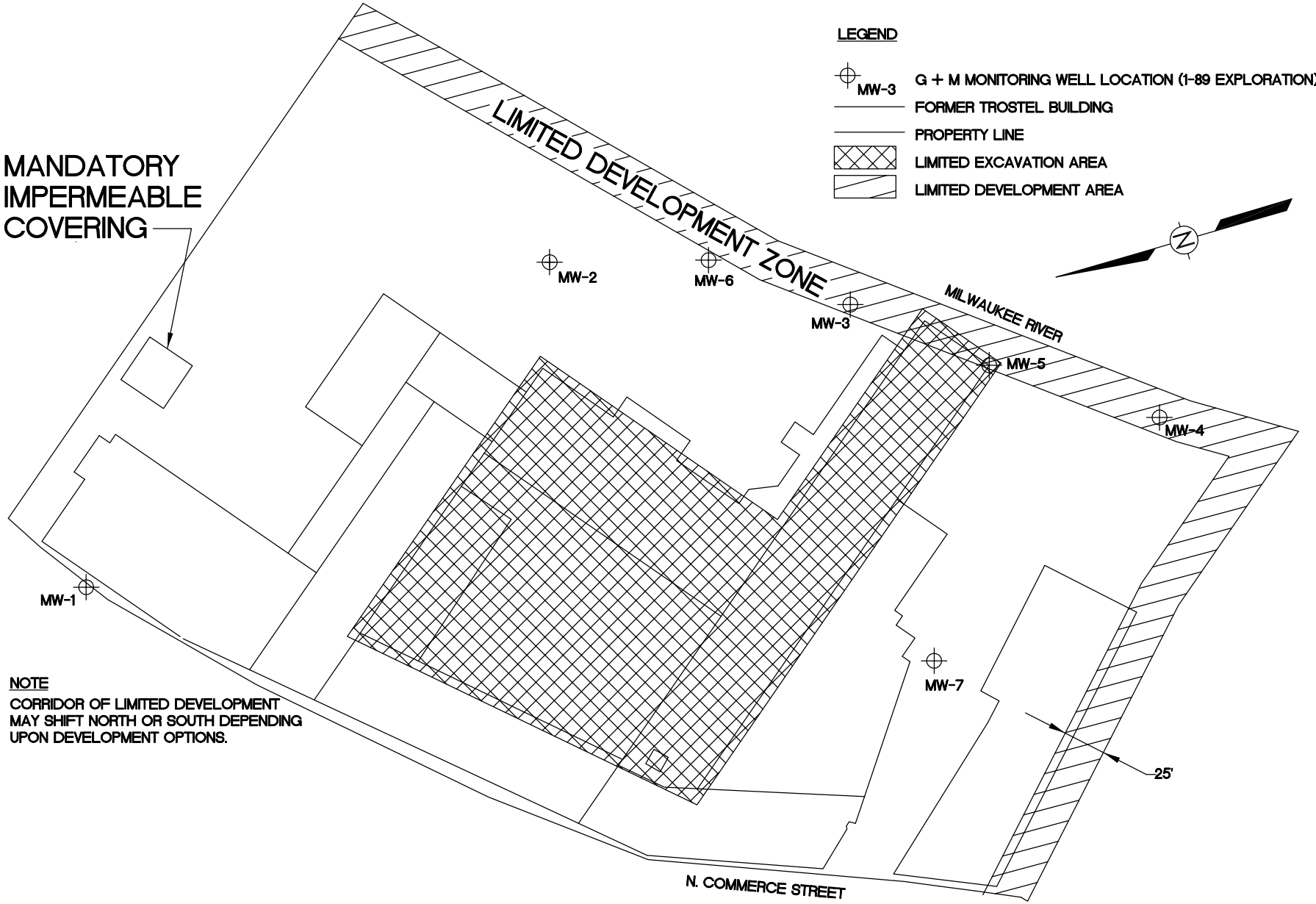
GP-6 SOIL PROBE LOCATION WITH TEMPORARY WELL

SCALE IN FEET

0 200'

85258

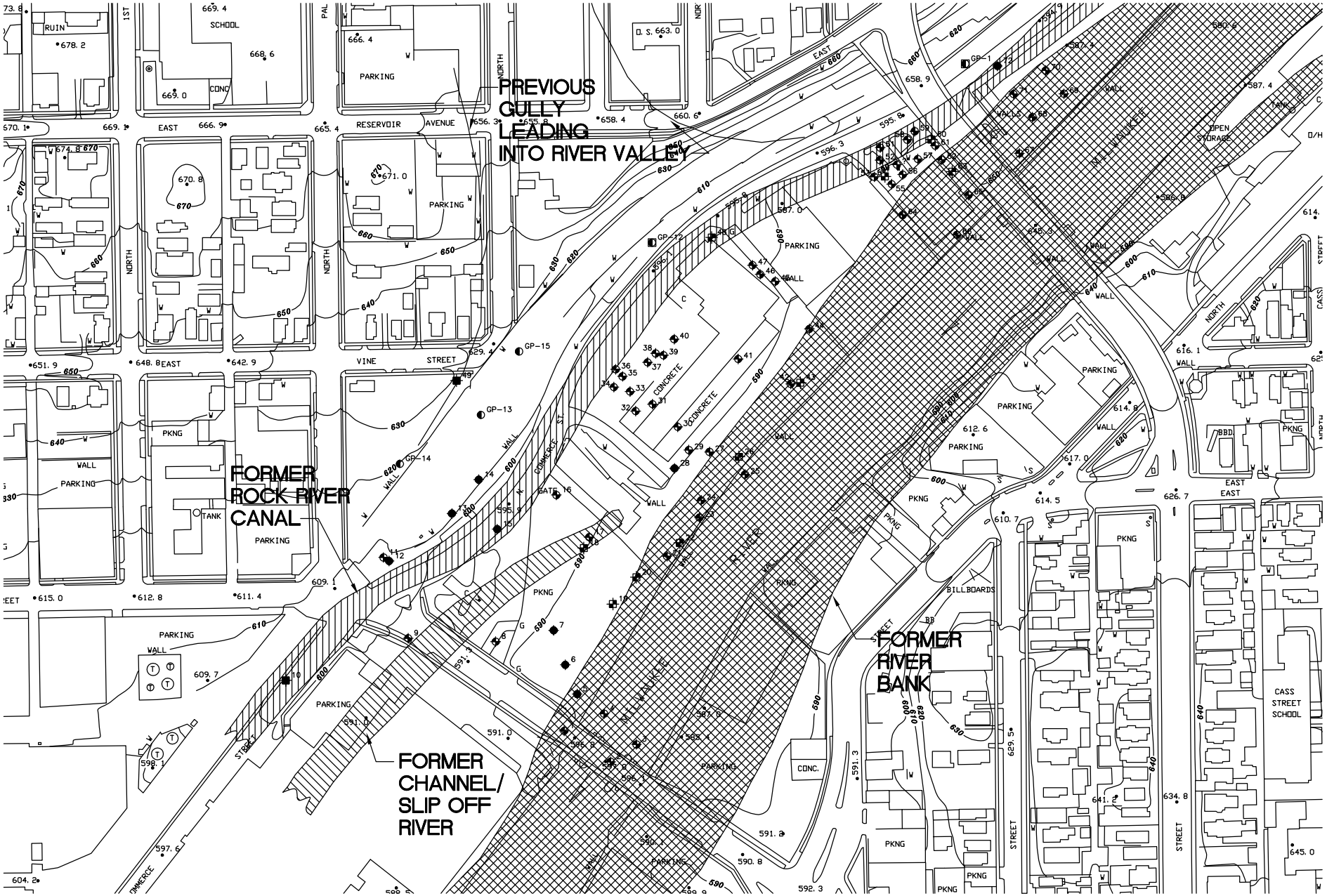
FIGURE 6.2.10



SITE DEVELOPMENT RESTRICTIONS
TROSTEL PROPERTY
MILWAUKEE, WISCONSIN

85258

FIGURE 6.2.11



FORMER CANAL AND RIVER BANKS
BEER LINE "B" DEVELOPMENT
MILWAUKEE, WISCONSIN

LEGEND

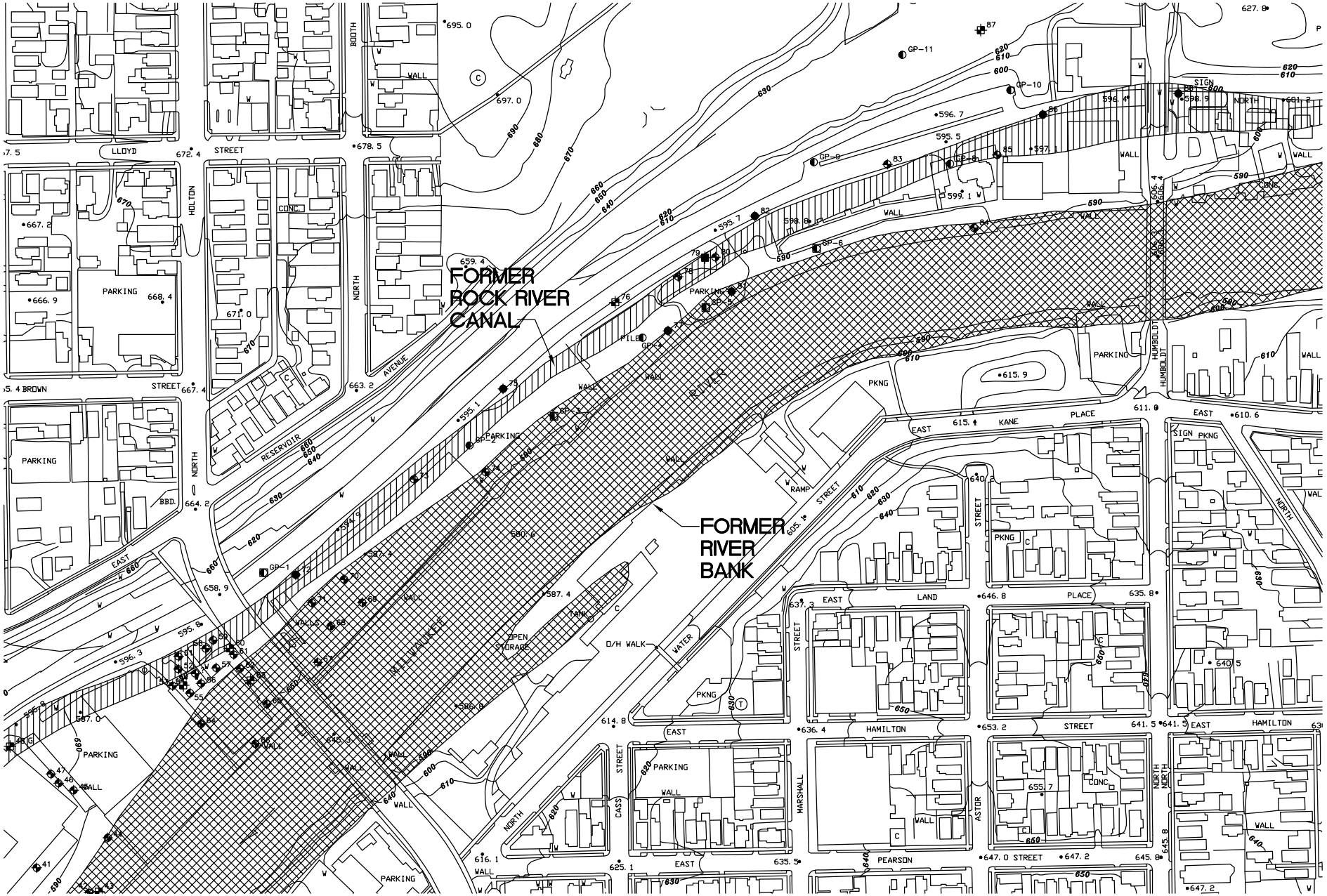
- FORMER CHANNEL/SLIP OFF RIVER
- FORMER RIVER BANK
- FORMER ROCK RIVER CANAL

SOURCE: "THE CENTRAL AREA OF THE CITY OF MILWAUKEE 1870"
CITY OF MILWAUKEE, CITY PLANNING DIV., 1958

SCALE IN FEET
0 200'

85258

FIGURE 6.3.2



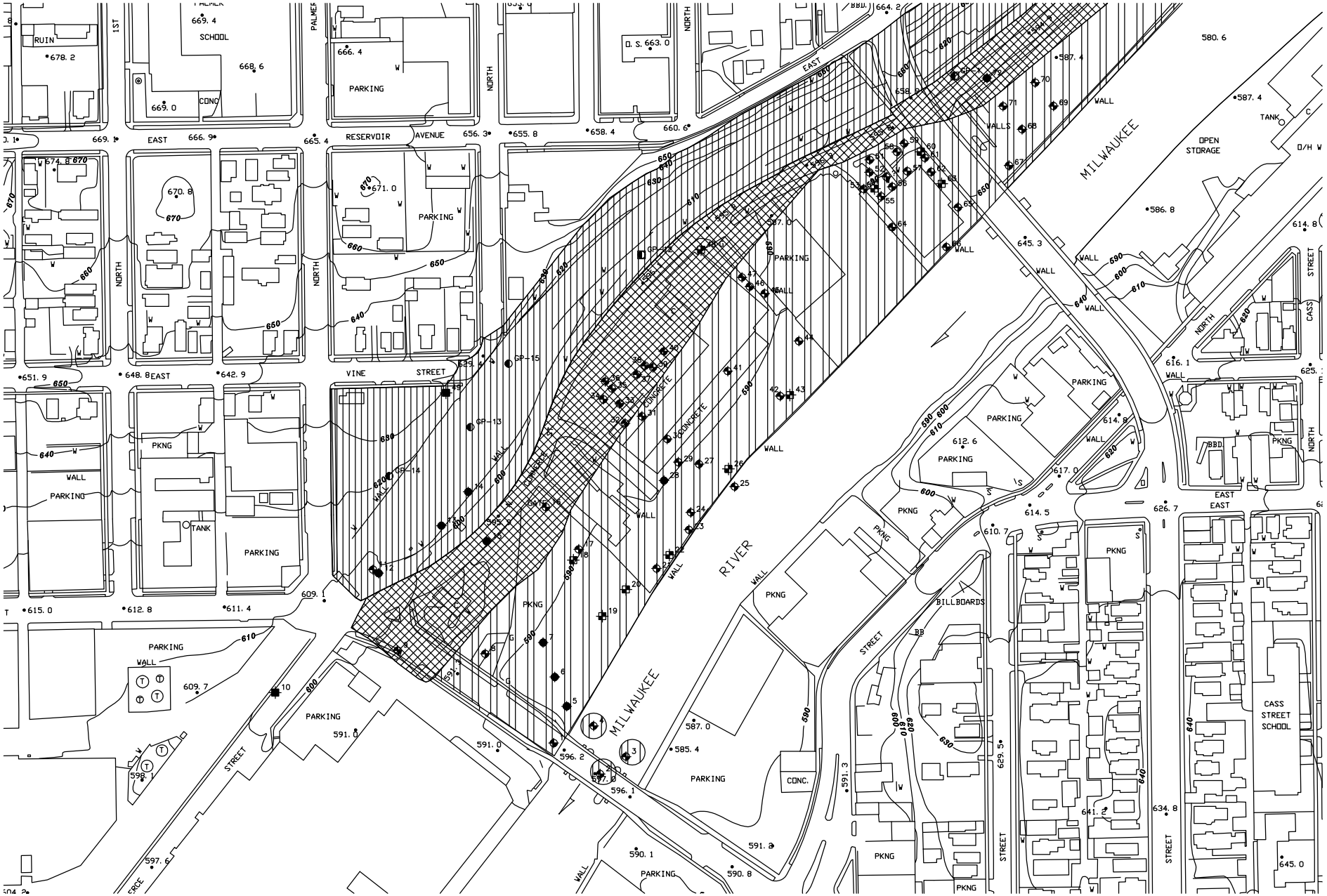
FORMER CANAL AND RIVER BANKS
BEER LINE "B" DEVELOPMENT
MILWAUKEE, WISCONSIN

SOURCE: "THE CENTRAL AREA OF THE CITY OF MILWAUKEE 1870"
CITY OF MILWAUKEE, CITY PLANNING DIV., 1958

SCALE IN FEET
0 200'

85258

FIGURE 6.3.3



SOIL CONDITION ZONES
BEER LINE "B" DEVELOPMENT
MILWAUKEE, WISCONSIN

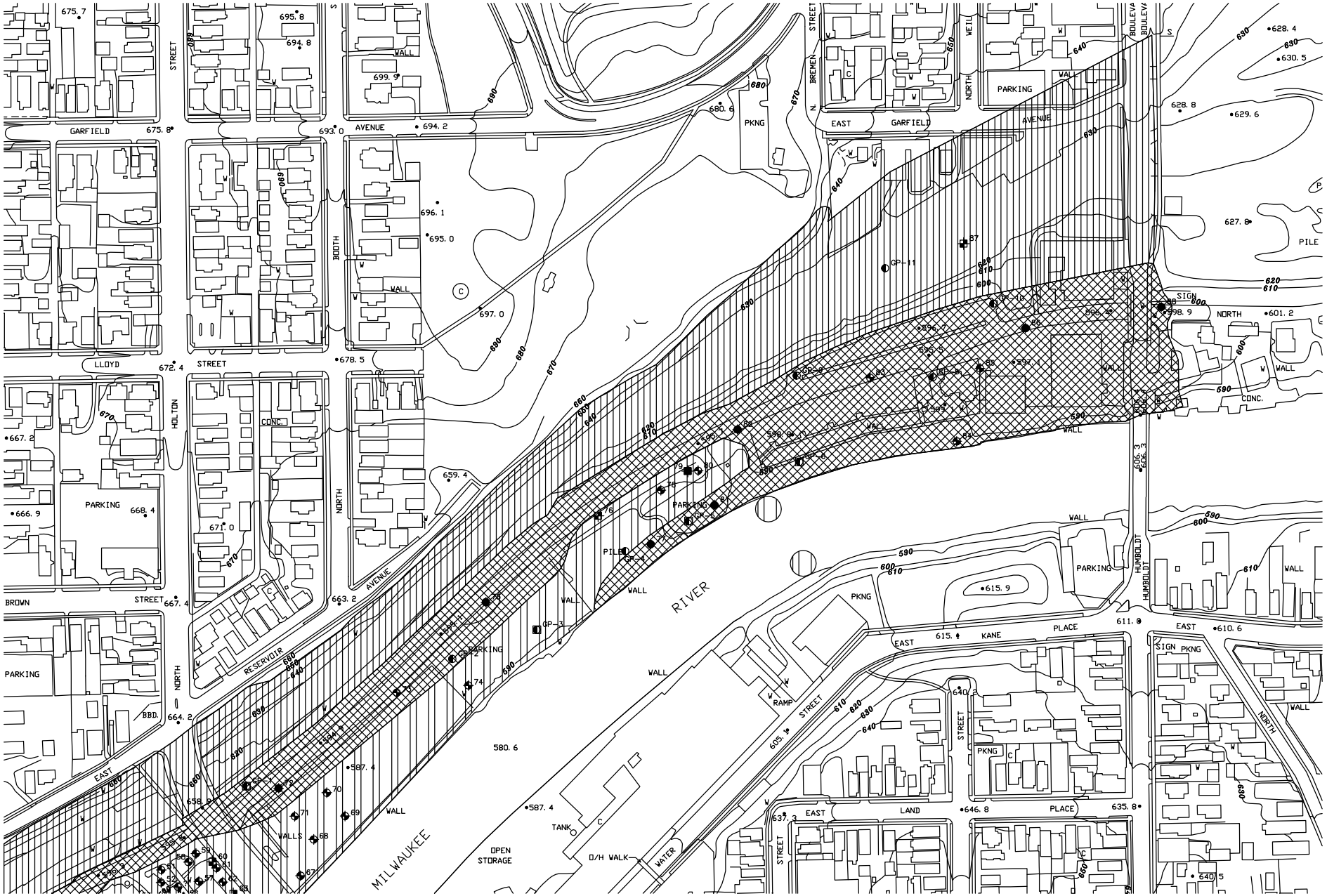
LEGEND

- ZONE A-LOOSE FILL OVERLYING ORGANIC SILT
- ZONE B-LOOSE TO DENSE GRANULAR FILL AND SOFT TO HARD COHESIVE FILL OVERLYING ALLUVIAL SAND OR GLACIAL TILL
- ZONE C-MOSTLY STIFF TO HARD COHESIVE FILL OVERLYING GLACIAL CLAY TILL

SCALE IN FEET
0 200'

85258

FIGURE 6.3.4



SOIL CONDITION ZONES
BEER LINE "B" DEVELOPMENT
MILWAUKEE, WISCONSIN

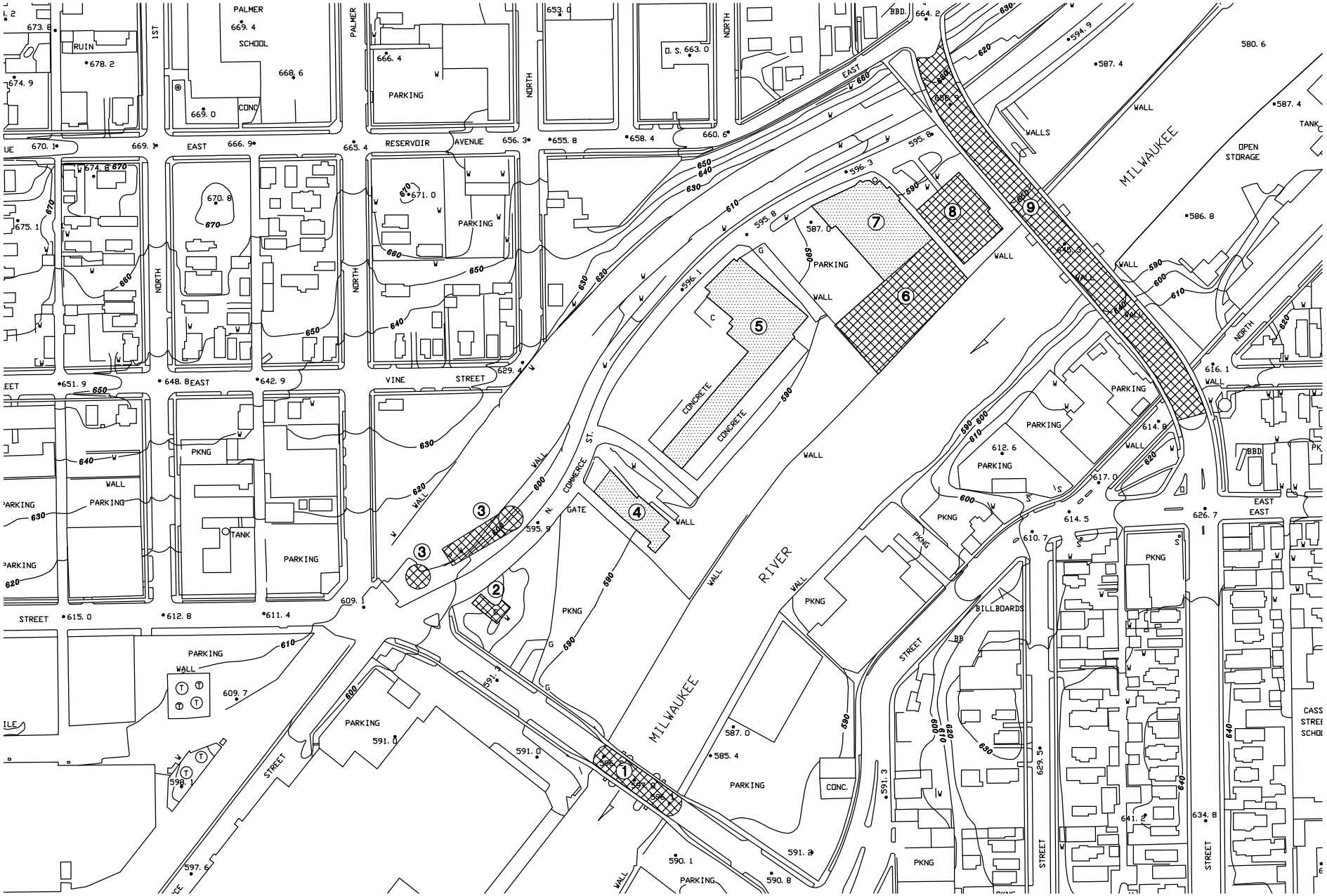
LEGEND

- ZONE A-LOOSE FILL OVERLYING ORGANIC SILT
- ZONE B-LOOSE TO DENSE GRANULAR FILL AND SOFT TO HARD COHESIVE FILL OVERLYING ALLUVIAL SAND OR GLACIAL TILL
- ZONE C-MOSTLY STIFF TO HARD COHESIVE FILL OVERLYING GLACIAL CLAY TILL

SCALE IN FEET
0 200'

85258

FIGURE 6.3.5



EXISTING AND FORMER STRUCTURE FOUNDATIONS
BEER LINE "B" DEVELOPMENT
MILWAUKEE, WISCONSIN

LEGEND

EXISTING STRUCTURES

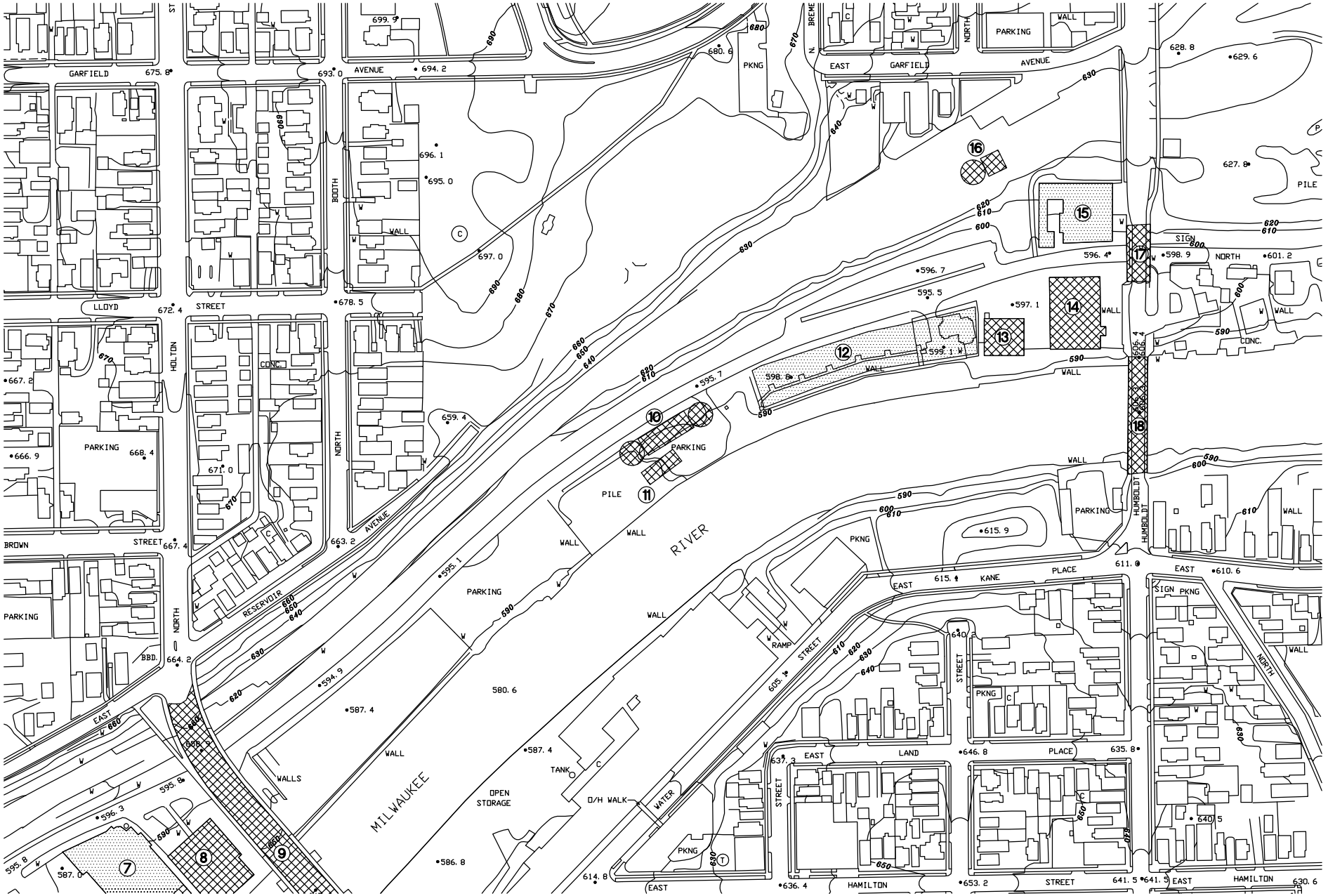
FORMER STRUCTURES

SCALE IN FEET

0 200'

85258

FIGURE 6.3.6



LEGEND

EXISTING STRUCTURES

FORMER STRUCTURES

SCALE IN FEET

0 200'

EXISTING AND FORMER STRUCTURE FOUNDATIONS
BEER LINE "B" DEVELOPMENT
MILWAUKEE, WISCONSIN

85258

FIGURE 6.3.7