

**MEETING: REGULAR MEETING OF THE PUBLIC WORKS &
HIGHWAYS COMMITTEE**

DATE & TIME: Wednesday, August 14, 2024 at 5:30 PM

**LOCATION: Germantown Village Hall Board Room
N112 W17001 Mequon Road**

Any member of the body and/or citizen may attend the meeting virtually through the WebEx platform, Meeting #: **2555 672 0428** Password: **ZNmFyjsD343** which can be accessed by phone at 408-418-9388 or by logging on at: <https://villageofgermantown.my.webex.com/villageofgermantown.my/j.php?MTID=mc28ed9f85300bb8f63267a15d2f40b55>

Citizens not wishing to attend the meeting personally or virtually may submit any public comments by sending an email to comments@germantownwi.gov by 4 p.m. on the day of the meeting so that it can be provided to the members of the body for their consideration.

Previously recorded Village Board Meeting Videos can be viewed at https://www.youtube.com/channel/UCOYp0EgELzTCa9X_iCohyhQ.

AGENDA

- I. **CALL TO ORDER:** *This meeting has been given public notice in accordance with Section 19.83 and 19.84, Wis. Stats, in such form that will apprise the general public and news media of subject matter that is intended for consideration and action.*
- II. **ROLL CALL:**
- III. **APPROVAL OF MINUTES:**
 - A. Minutes: July 3, 2024
- IV. **PUBLIC COMMENT:** *Please be advised per State Statute Section 19.84(2), information will be received from the public. It is the policy of this municipality that there be a three-minute time period, per person, with time extensions per the Chief Presiding Officer's discretion; be further advised that there may be limited discussion on the information received, however, NO ACTION will be taken under public comments.*
- V. **UNFINISHED BUSINESS**
- VI. **NEW BUSINESS:**
 - A. Resolution adopting the Comprehensive Tree Plan as required per municipal code 17.60.
 - B. Award of Kinderberg splash pad repairs to Carrico Aquatics for an amount not to exceed \$57,800 from accounts 91591000-592100 and 10591000-1000.
 - C. Authorization to temporarily overfill Water Utility staffing by one position from September - December 2024.
 - D. Award of Fireman's Park restroom, exterior and interior painting project to MACORP, LLC for an amount not to exceed \$9,082.00 from capital account 40564000-592300.
 - E. Award of library copula roof leak repair to Noffke Roofing in amount not to exceed \$23,500.00 from capital account 40564000-592300.
 - F. Award of Fireman's Park standing seam roof project to JK Contractors in an amount not to exceed \$19,060.00 from capital account 40564000-592300.

G. Review of Development Handbook Update

H. Department of Public Works 5 Year Strategy

VII. DIRECTORS'S REPORT:

A. August Director's Report

VIII. NEXT MEETING DATE:

IX. ANNOUNCEMENTS:

X. ADJOURNMENT:

UPON REASONABLE NOTICE, efforts will be made to accommodate the needs of disabled individuals through appropriate aids and services. For additional information or to request this service, please contact the Village Clerk at (262)250-4745 at least 2 days prior to the meeting.

MEETING:	REGULAR MEETING OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE
DATE AND TIME:	Wednesday, July 3, 2024 5:30 PM
LOCATION:	Germantown Village Hall Board Room N112 W17001 Mequon Road

MINUTES

- I. **CALL TO ORDER:** Chairperson Kamiske called the meeting to order at 5:30PM.
- II. **ROLL CALL:** Trustee Terri Kaminski, Rick Miller and Phil Hudson were all present.
Absent and excused Trustee Bob Warren

- III. **APPROVAL OF MINUTES:** PWHC 6/5/24 Minutes for approval
Motion: Approve as presented
Motioned By: Phil Hudson
Seconded By: Rick Miller

Yes: Terri Kaminski, Rick Miller, Phil Hudson

No: None

Abstain: None

Motion Passed (Yes 3, No 0, Abstained 0)

A. Meeting minutes 6/5/2024

- IV. **PUBLIC COMMENT:** 2 Citizens spoke
 Melanie Smythe - Citizen - N140W17938 Cedar Lane
 Jan Miller - Citizen - Distric 4 - PO Box 837

V. **NEW BUSINESS:**

A. Comprehensive Tree Plan Review and Discussion

The recent addition of right of way tree pruning and related communication and community issues brought the need for a comprehensive tree plan to the PWHC's attention. The staff was directed to develop a comprehensive plan before any additional ROW tree work were to continue.

Over the past few months, staff have developed a plan. That draft plan is attached for review and discussion.

Items covered in the draft that may be of interest to discuss:

- Urban vs. rural approaches
- Tree planting cycle (to fill vacant urban plots)
- A revised approved tree list
- A proposed pruning cycle for urban trees
- Proposed changes to the permit process

- The makeup and scope of the Tree Board
- Community outreach requirements for work

After review and discussion, staff will revise the plan. We anticipate submitting a plan for approval at the August PWHC and a subsequent Village Board meeting.

Matt Mortwedt went through the tree plan. This topic was for discussion only.

Ordinance 17.60 was looked over at the time when the plan was put together by the department. A few highlights that are up for discussion would be:

The department would take a different approach; urban vs. rural. Rural areas would be handled by the staff and the urban areas would be handled by a contracted company.

Tree planting cycle - Plant trees over the next five years in the remaining plots. There would also be a revised tree list and there would be more diverse trees available to us for planting. The pruning cycle for urban areas will be approximately every nine years.

Changes to the permit process. Having HOA be more involved in taking care of their own trees. The Village would still be involved in overseeing the care of those trees. A Tree Board will be put in place with citizens' participation and what authority they would have on that board. Lastly, community outreach and what that would look like in regard to planting, pruning and removal.

What the Tree Board would look like - A three-person board would be made up of a citizen with tree experience, a Village Trustee, and the Village Forester. This Board would be in an advisory roll and appointed by the President. Chairperson Kaminski would like to know how this will be communicated to the residents. Matt Mortwedt followed up stating it would use the following way to communicate with the residents. Such as letters, social media and village website depending on the project, would depend on what type of communication would be used. This topic will be brought back in front of this committee in August for a resolution.

B. 5-Year Capital Improvement Plan

The attached 5-Year Capital Improvement Plan will serve as a starting point for establishing the 2025 budget. The document projects the needs of the Village that will need to be evaluated and considered for funding in 2025.

Matt Mortwedt - Public Works Director - The plan was put together by Steve Kreklow, Matthew Uselding in the finance department, other department heads and himself put together over the last couple of months. The plan is to show what the Village will need over the next five years. It is not to approve a capital budget at this time. Some of the needs that were spoken about are as follows.

Waste Water - a new facility plan, upgrades that may be required for certain lift stations with some consolidations.

Water utility - Well # 7 rehab, work on some curbstops that are having some issues.

Engineering - Division Road reconstruction, increased road funding

Equipment - work with staff on an equipment plan, what is needed, life expectancy on what we have. Next year we will need to purchase a plow truck.

Building needs - Report that Graef did, a study on what our maintenance needs and capital improvements over the next 5-10 years. Overall, looking at what the department needs, life expectancy, the condition of the assets that we own and how to

deal with them over time and a better understanding moving forward.
Administrator Kreklow would like the 5-year capital improvement plan to go to the board.

Motion: Approve as presented

Motioned By: Phil Hudson

Seconded By: Rick Miller

Yes: Terri Kaminski, Rick Miller, Phil Hudson

No: None

Abstain: None

Motion Passed (Yes 3, No 0, Abstained 0)

C. Report of Emergency Repair to Water Tower #1 fill pipe.

A few weeks ago, water utility staff noticed small drips of water inside the column at Tower #1 which quickly escalated to a small cascade of water. The leak knocked out Tower Communications systems, which required water utility staff to build a false roof over the communication room to divert the water. I contacted the Tower 3 Water Tower inspector for possible repair options. Seven Brothers, the contractor rehabbing Tower 3, was able to send out repair staff to install a semi-permanent repair clamp over the small hole over the fill pipe. Seven Brothers, 50805 Rizzo Drive, Shelby Township, MI 48315 Invoice-\$9,800.00-(leak repair) and \$3,000.00-(replacement of aluminum jacketing)

There was some damage that occurred to equipment. This repair could not go through the normal channels due to the type and emergency need of the repair. This is just a report of what work that was done.

Trustee Miller wanted to know if this was a permanent repair. DPW Director felt comfortable that the repair that was completed would last until the tower is rehabbed in a few years.

This was just a report. No motion was needed.

D. Award Contract to Relay Water Main in Various Locations to Vinton
Construction of Manitowoc, Wisconsin, in the amount of \$444,983.

This Water Utility improvement project (#2402) is located within two areas: the Glenwood Park Subdivision and the Hilbert Lane at Sylvan Circle intersection, as shown in the attached maps. The existing water mains are 6-inch dia. ductile iron and have experienced breaks. Relay projects were approved in the 2024 budget and this work is essential to upsize mains to 8-inch dia. and 12-inch dia. for fire flow pressures and to replace deteriorated pipe material that has resulted in leaks and required repairs. This project was advertised in June, and the Village received 5 bids.

Contractor	Amount
Vinton	\$444,982.80
Advance	\$467,288.00
MJ	\$487,980.00
Mid City	\$588,690.00

Globe	\$623,936.00
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The lowest qualified bidder was below the \$590,310 construction estimate. The schedule for the work is to begin this summer. Once the water main contractor is completed later this summer, then the Road Program contractor will complete paving work in Glenwood Park Subdivision this fall. The water main alignment impacts a number of driveway culverts, so these culverts will be replaced as part of the project. Additional ditching is planned within the project limits to address drainage complaints. Staff has transmitted notification letters to property owners within the project limits regarding both the water work and the road work with a link to the project webpage: <https://www.germantownwi.gov/176/Construction-Projects>.

The contract was awarded to Vinton with a 10% contingency in the amount of \$489,480.80

Motion: Approve as presented

Motioned By: Phil Hudson

Seconded By: Rick Miller

Yes: Terri Kaminski, Rick Miller, Phil Hudson

No: None

Abstain: None

Motion Passed (Yes 3, No 0, Abstained 0)

- E. Award a Contract for Final Design & Bid Services of the High Point Pass Road Construction to raSmith in the amount not to exceed \$82,000

The consulting firm, raSmith, has been instrumental as the Design Engineer for Village on the Holy Hill Road, Gateway Crossing, Richfield Utility Extension, Glenwood Park projects, and the preliminary Design for High Point Pass and the railroad crossing. In addition, consultants with raSmith have provided various construction inspection services and staking for these projects, and continue to provide engineering services for ongoing project work.

Staff requested raSmith to provide a scope of services to complete the Final Design of High Point Pass Construction project, including the railroad crossing design. This project includes the intersection improvements at Holy Hill Road and extends 1400 south to the Railroad Crossing. This request was made in conjunction with the TID amendment for the project approval process with the Public Works and Highways Committee, the Village Board and the Joint Review Board.

This final design work is anticipated to begin in summer 2024, with construction anticipated in 2025.

The plan is to start the design process right away, bid on the project over the winter and start in the spring of 2025. This project is needed in order for Truck Country to have access to this development.

This project was awarded to raSmith for time and material not to exceed \$82,000.00

TID # 8

Motion: Approve as presented

Motioned By: Rick Miller

Seconded By: Phil Hudson

Yes: Terri Kaminski, Rick Miller, Phil Hudson

No: None

Abstain: None

Motion Passed (Yes 3, No 0, Abstained 0)

F. Road Program Funding and Effectiveness

The Director discussed the attached memo addressing the effectiveness of road funding over the past five years.

Over the past number of years (2019-2023), this budget line item has stayed the same at 1.5 million. With inflation, we have not been able to keep up. There is a need for that budget line item to increase in the future. The cost for road repair has more than doubled in that time frame. The five-year average is that the Village is replacing roads beyond 50 years. Looking at just 2023, that road replacement would be at 80 years old. Matt, the Director of Public Works, is taking this opportunity to request additional funding for the road funding when budget time comes around next year.

This report was for informational and discussion only.

VI. DIRECTORS'S REPORT:

A. July Director's Report

Matt Mortwedt gave his directors' report

Well # 12 Testing has taken place, but the results are not back, but things look positive both from a production standpoint and the condition of the water.

Working with the PSC regarding the CPR report that is several years late. Currently, Ruekert- Mielke is assisting us with that task.

We are coming close to the deadline for our MS4 storm water permit. Graef is assisting us with that task as well. This is a large project that would take many man hours to complete and at the present time we do not have the staff to take on the task.

Department updates - we have brought on Joe Harvat as our Civil Engineer - the engineering staff is now complete. In the public works area, we have had some difficulty filling positions. In the future, an item will be brought in front of this committee regarding compensation for getting your CDL. The Village would pay for the applicant to obtain their CDL license with the understanding that the hire would work for the Village for a certain number of years in return.

The new DPW building is in the final stretch, and we should expect occupancy by the end of July, but will have the opportunity to start moving in a little early. The big move will take place on September 1, 2024. Open house date is pending.

Sealcoat/Road project update - They are moving forward rather quickly. Letters have gone out to homeowners.

Goldendale Booster is scheduled to start up in July. The operators' strike is over, and tower # 4 will be raised around July 15

The complaint log is pretty standard.

This completes the DPW Directors report - for information only.

VII. NEXT MEETING DATE: August 14, 2024 at 5:30 PM

VIII. ANNOUNCEMENTS: NONE

IX. ADJOURNMENT: Chairperson Kaminske adjourned the meeting at 6:27 PM

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: August 14, 2024

PLACEMENT: Resolution

ITEM TITLE: Resolution adopting the Comprehensive Tree Plan as required per municipal code 17.60.

SUBMITTED BY: Matthew Mortwedt, Public Works Director

SUMMARY EXPLANATION:

The attached draft of the Comprehensive Tree Plan (attachment 1) proposed by staff is intended to satisfy the requirement for such a plan outlined in municipal code section 17.60. That section of the code describes the Comprehensive Tree Plan as a plan that covers the "...care, preservation, pruning, planting, replanting, removal or disposition of trees ...along streets, and in other public places." The plan is intended to serve as a guide of staff on proper care of public trees, proper techniques for performing work, and proper communication with residents. The plan also serves as a guide for residents of Germantown regarding expectations of the Department of Public Works when it comes to caring for public trees.

Should the plan be adopted by resolution, additional changes to the code will be required to avoid conflicts and for consistency. Those changes are outlined in attachment 2 to this agenda item. Changes in the code will be considered at a PWHC meeting in the near future.

The draft plan was reviewed by the Public Works and Highway Committee in July 2024 and was available for public comment through July 31, 2024. Though no public comments were received, some revisions to the plan were made based on additional staff review.

Highlights of the plan include:

- Creation of a Tree Board (also required by 17.60), including a citizen member.
- Creation of a permit process, managed by DPW, for work on public trees, including provisions for HOA's to become a permittee
- Creation of communication standards with residents based on the type of tree maintenance activity being performed.
- Standards for new subdivisions and developers
- A new list of approved trees based on size, as required by code.

ATTACHMENT:

1. Comprehensive Tree Plan Resolution
2. Attachment 1 - Comprehensive Tree Plan - Final Draft

3. Attachment 2 - Code Change Log - Comprehensive Tree Plan

STAFF RECOMMENDATION:

Recommendation for adoption by resolution of the Comprehensive Tree Plan to the Village Board for approval.

ACTION BY Committee:

RESOLUTION NO. 2024-____

RESOLUTION ADOPTING THE COMPREHENSIVE TREE PLAN

WHEREAS, the Germantown Village Board adopted the tree ordinance, which was intended to encourage the preservation, expansion, protection, and proper maintenance of the village urban forest; and

WHEREAS, the Germantown Village Board recognizes that benefits of a well maintained urban forest include increased biodiversity, improved public health and well-being, infrastructure protection, community engagement, and equitable access the benefits of trees; and

WHEREAS, the creation of a long term management plan for Germantown's urban forest is consistent with the Germantown tree ordinance; and

WHEREAS, the tree ordinance requires the adoption of a Comprehensive Tree Plan that includes a written plan for the care, preservation, pruning, planting, replanting, removal or disposition of public trees.

NOW, THEREFORE, BE IT RESOLVED, by the Village Board of the Village of Germantown, as follows:

That the Village of Germantown Village Board adopts the Comprehensive Tree Plan attached hereto as Exhibit A effective the date of this Resolution.

Passed by the Village Board this ____ day of September, 2024.

Dean Wolter, Village President

Donna Ott, Village Clerk

**The Village of Germantown
Comprehensive Tree Plan
Adopted: TBD
Revised: N/A**



Matt Mortwedt, Director of Public Works

Scott Anderson, Superintendent of Highways, Parks Buildings & Grounds

Nathan Schuettpelz, Village Forester

The Village of Germantown Comprehensive Tree Plan

In the heart of the Village of Germantown lies a natural treasure—a vibrant urban forest that not only enhances the beauty of our community but also serves as a vital asset for our environment, economy, and quality of life. Recognizing the invaluable benefits that trees provide, from purifying our air and water to mitigating climate change and enhancing biodiversity, the Village is committed to fostering the sustainable management and stewardship of our urban forest for generations to come.

This comprehensive tree plan represents a collaborative effort between municipal leaders, community stakeholders, and environmental experts to establish a strategic framework for the preservation, enhancement, and responsible utilization of our tree resources. Grounded in sound science, best practices, and community engagement, this plan seeks to address the diverse needs and priorities of our residents while ensuring the long-term health, resilience, and sustainability of our urban forest ecosystem.

Through this plan, we aspire to achieve the following key objectives:

1. *Promote Biodiversity and Resilience:* By prioritizing the planting of native tree species and fostering a diverse urban forest canopy, we aim to enhance ecological resilience, support local wildlife habitat, and minimize the risk of pest outbreaks and disease epidemics.
2. *Enhance Public Health and Well-being:* Trees play a crucial role in improving air quality, reducing urban heat island effects, and providing opportunities for recreation and relaxation. By strategically planting and maintaining trees in our neighborhoods, parks, and public spaces, we can promote physical and mental well-being for all residents.
3. *Ensure Safety and Infrastructure Protection:* Proper tree management, including pruning, removal, and maintenance, is essential for mitigating potential hazards such as falling limbs, root damage to infrastructure, and obstruction of utility lines. Through proactive risk assessment and management strategies, we aim to safeguard public safety and protect valuable assets.
4. *Foster Community Engagement and Education:* Engaging residents, businesses, schools, and community organizations in tree planting, care, and advocacy efforts is critical for building a culture of environmental stewardship and resilience. By providing educational resources, volunteer opportunities, and outreach initiatives, we seek to empower individuals and groups to take an active role in caring for our urban forest.
5. *Ensure Equitable Access and Distribution:* Every neighborhood in the Village of Germantown deserves equitable access to the benefits of trees, regardless of socio-economic status or geographic location. Through strategic planning and resource allocation, we will prioritize tree planting and maintenance efforts in underserved areas to promote social equity and environmental justice.

As we embark on this journey to cultivate a greener, healthier, and more sustainable future for the Village of Germantown, we invite all residents, businesses, and stakeholders to join us in this collective endeavor. Together, we can harness the power of trees to enrich our community, strengthen our resilience to environmental challenges, and leave a lasting legacy for future generations to enjoy.

The Comprehensive Tree Plan and the Village of Germantown Code of Ordinances. This Comprehensive Tree Plan was developed to meet the requirements set forth in the Village of Germantown code of ordinances, section 17.60. The plan is intended to supplement provisions

17.60 and meet the requirements outlined therein. This plan serves as a guide for Department of Public Works staff and residents. The plan sets expectations for how Village owned trees are managed.

Appendices:

Appendix A – Tree Planting Standards Checklist

Appendix B – Tree Pruning Standards Checklist

Appendix C – Tree Removal Standards Checklist

Appendix D - Required Forestry Budget

Appendix E – Non-Residential Development Street Tree Requirements

Appendix F - Permit

Urban and Rural Trees in the Right of Way. The Department of Public Works (DPW) maintains all trees within the right of way (ROW), also referred to as street trees. The right of way is a type of easement granted or reserved over the land for transportation purposes, such as roads, paths, transmission lines, pipelines, etc. Within the Village of Germantown, the right-of-way is most typically denoted for the purpose of roadway construction or maintenance. The land itself is owned directly by the Village and is not part of the adjacent property. DPW staff will maintain rural trees in the ROW and contract for tree maintenance in the ROW in more urban areas.



Image 1 – Right of way

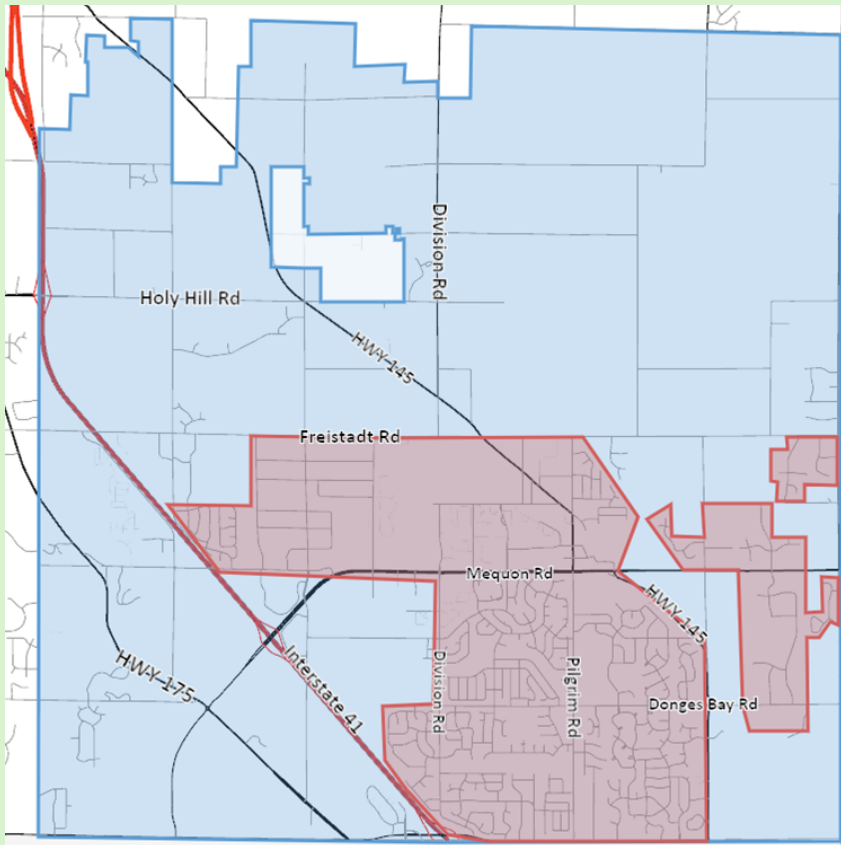


Image 2 – Urban (red) and Rural (blue) areas

Trees in Parks and on Village Owned Property. In addition to ROW trees, the DPW maintains all Village of Germantown Park trees, and trees on other property owned by the Village, such as properties with Village facilities. Park tree maintenance is conducted in a manner consistent with urban trees, discussed later in this plan.

Private Trees. The Village of Germantown does not plant or maintain trees on private property. Private trees are only subject to being maintained by DPW when the private tree affects the lives, health, safety and welfare of the public, public property or property owned or controlled by the Village.

1. The tree is determined to be a public nuisance in accordance with municipal code 17.60(5)a.
2. The tree is determined to be hazardous in accordance with municipal code 17.60(5)c.

Only when these provisions have been met will the Village of Germantown act upon, or compel action, upon private trees. Absent these criteria, private trees are considered a private matter. Issues between residents regarding private trees are also private.

The Village of Germantown is responsible for maintenance of right-of-way trees (street trees).

Tree Planting and Tree Replacement

Planting and Replacement Program Goals. The Village of Germantown seeks to grow the urban forest through a planting and replacement initiative. The goals of the planting program are to increase canopy cover, diversify tree species, enhance the public health and well-being, mitigate urban heat island effect, improve air quality, improve water quality, improve stormwater management, and provide greater biodiversity and habitat.

Planting Season. The time of year a tree is planted can greatly affect the tree's establishment because newly planted trees require water to survive and grow. Planting during the spring and fall will help ensure tree establishment and survival.

The planting season in Germantown extends from April 1 – June 15 in the spring and September 15 – October 31 in the fall. Planting during this timeframe is recommended.

If a planting permit is issued outside of the ideal planting season, the Superintendent of Highway, Buildings and Grounds may defer planting until the next planting season to promote survivability. The Superintendent will also factor in the species and location when deciding on exceptions to the planting season.

Planting Cycle. The Village plans to fill vacant planting sites over a five-year period.

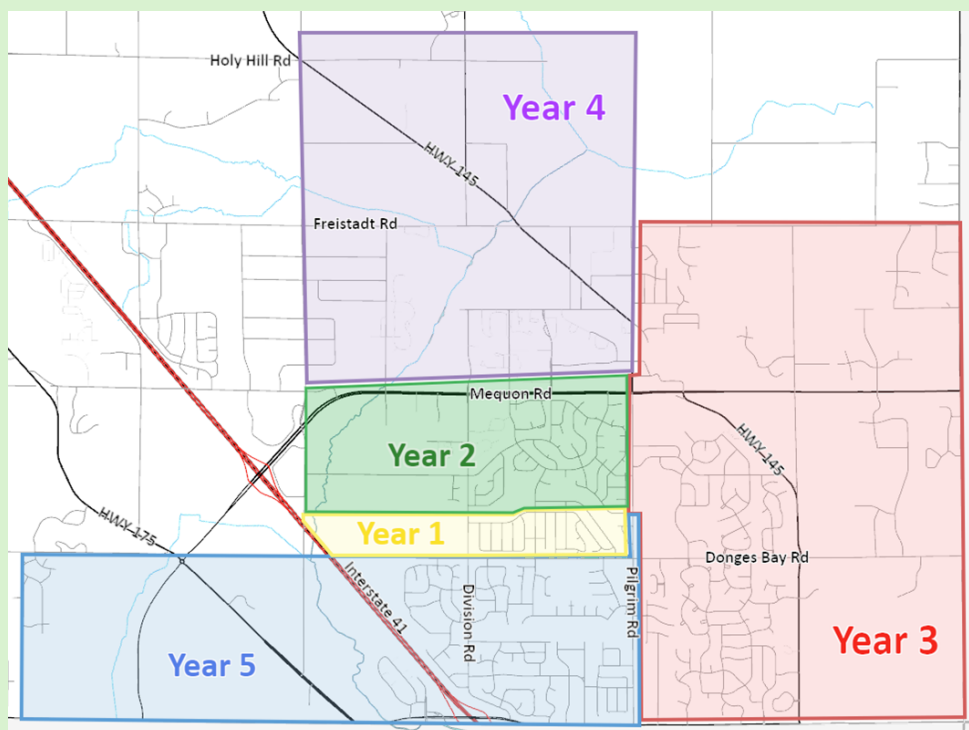


Image 3 - Five Year Vacant Planting Map

Species Diversity. Lessons learned from the Emerald Ash Borer (EAB) epidemic have resulted in a more tempered approach to urban tree species selection. In the past the “30-20-10” planting rule was used which stated you wouldn’t plant more than thirty percent from one family, no more than twenty percent from one genus and no more than 10 percent from one species. Municipalities that followed this rule, or perhaps maintained even less tree diversity, may have lost as many as one in five trees because of EAB.

The Village of Germantown now adopts a “20-10-5” rule. This means that no more than twenty percent of trees will be planted from one family, no more than ten percent from one genus and no more than five percent from one species. This rule will be evaluated in future years as current research seems to indicate that even more species diversity may be required to ensure the most resilient urban forest.

It is also worth noting that diversity should address age, size and location and those factors should play a role in decisions that are made regarding new planting.

Geographic Information System (GIS). The Germantown GIS must be updated with the location, species and year planted for all trees. Similarly, if an identified tree plot is left vacant the GIS must be updated.

Condition Assessment: Over a 5-year cycle, the Village will conduct a condition assessment of all urban trees identified in GIS. The condition rating will be added as an attribute to the tree asset in GIS.

Approved Tree List. The following trees are approved for planting in the ROW and parks:

SMALL TREES

Scientific Name	Common Name	Cultivars
<i>Amelanchier arborea</i>	Downy Serviceberry	
<i>Amelanchier x grandiflora</i>	Apple Serviceberry	‘Autumn Brilliance’, ‘Robin Hill’
<i>Amelanchier laevis</i>	Allegheny Serviceberry	‘Cumulus’, ‘Lustre’
<i>Carpinus caroliniana</i>	American Hornbeam	‘Firespire’
<i>Cercis canadensis</i>	Eastern Redbud	
<i>Crataegus crusgalli inermis</i>	Thornless Cockspur Hawthorn	
<i>Crataegus phaenopyrum</i>	Washington Hawthorn	
<i>Crataegus viridis</i>	Winter King Hawthorn	‘Winter King’
<i>Maackia amurensis</i>	Amur Maackia	‘Starburst’, ‘Summertime’, ‘JFS-Schichtel1’
<i>Malus spp.</i>	Flowering Crabapple	‘Adirondack’, ‘Jewelcole’, ‘Bob White’, ‘Harvest Gold’, ‘Jackii’, ‘Prairiefire’, ‘Professor Sprenger’, ‘Red Bud’, ‘Royal Raindrops’, ‘Sugar Tyme’, ‘Lanzam’, ‘Hargozam’
<i>Ostrya virginiana</i>	Ironwood	
<i>Syringa pekinensis</i>	Peking Lilac	‘China Snow’
<i>Syringa reticulata</i>	Japanese Tree Lilac	‘Ivory Silk’, ‘Summer Snow’, ‘Snowcap’, ‘Ivory Pillar’, ‘Snowdance’

<i>Cornus mas</i>	Cornelian Cherry Dogwood	‘Golden Glory’
<i>Prunus sargentii</i>	Sargent Cherry	‘JFS-KW58’

MEDIUM TREES

Scientific Name	Common Name	Cultivars
<i>Aesculus glabra</i>	Ohio Buckeye	‘Sunset’
<i>Cladrastis kentuckea</i>	American Yellowwood	
<i>Carpinus betulus</i>	Hornbeam	‘JFS-KW1CB’; ‘Fastigiata’
<i>Phellodendron amurense</i>	Amur Cork tree	
<i>Nyssa sylvatica</i>	Black Tupelo	
<i>Tilia spp.</i>	Linden	‘Crimean’; ‘Harvest Gold’; ‘Sterling’; PNI 6051’

LARGE TREES

Scientific Name	Common Name	Cultivars
<i>Aesculus flava</i>	Yellow Buckeye	
<i>Carya cordiformis</i>	Bitternut Hickory	
<i>Celtis occidentalis</i>	Hackberry	‘Prairie Pride’, ‘Chicagoland’, ‘Windy Village’, ‘JFS-KSU1’
<i>Cercidiphyllum japonicum</i>	Katsuratree	
<i>Corylus colurna</i>	Turkish Filbert	Autumn Gold'
<i>Eucommia ulmoides</i>	Hardy Rubber Tree	
<i>Ginkgo biloba</i>	Ginkgo (male only)	Autumn Gold', 'Magyar', 'Princeton Sentry'
<i>Gleditsia triacanthos inermis</i>	Thornless Honeylocust	Imperial', 'Shademaster', 'Skyline/Skycole', 'Sunburst', 'Street Keeper/Draves'
<i>Gymnocladus dioica</i>	Kentucky Coffeetree	‘Espresso’, ‘Prairie Titan’, ‘Decaf’
<i>Liriodendron tulipifera</i>	Tuliptree	
<i>Platanus x acerifolia</i>	London Planetree	‘Exclamation’
<i>Quercus bicolor</i>	Swamp White Oak	
<i>Quercus x</i> ‘Crimschmidt’	Crimson Spire Oak	

<i>Quercus macrocarpa</i>	Bur Oak	
<i>Quercus robur</i>	English Oak	'Skymaster', 'Regal Prince', 'JFS-KW1QX'
<i>Quercus rubra</i>	Red Oak	
<i>Quercus x macdanielii</i> 'Clemons'	Heritage Oak	
<i>Quercus muehlenbergii</i>	Chinkapin Oak	
<i>Quercus x schuettei</i>	Swamp x Bur Oak	
<i>Ulmus x</i>	Hybrid Elm	'Accolade', 'New Horizon', 'Regal', 'Triumph', 'Discovery', 'Frontier', 'Pioneer', 'Cathedral'
<i>Ulmus parvifolia</i>	Lacebark Elm	

EVERGREENS TREES

Do not plant on streets, evergreens obstruct visibility making them hazardous on street locations.
Acceptable trees for parks and non-street tree locations.

Scientific Name	Common Name	Cultivars
<i>Abies concolor</i>	White Fir	
<i>Xanthocyparis nootkatensis</i>	Nootka Cypress	
<i>Juniperus chinensis</i>	Chinese Juniper	Iowa', 'Mounntbatten'
<i>Juniperus x</i>	Star Power Juniper	JN Select Blue'
<i>Picea glauca var. densata</i>	Black Hills Spruce	
<i>Picea omorika</i>	Serbian Spruce	
<i>Pinus bungeana</i>	Lacebark Pine	
<i>Pinus flexilis</i>	Limber Pine	Vanderwolf's Pyramid'
<i>Pinus strobus</i>	Eastern White Pine	Fastigiata'
<i>Pinus sylvestris</i>	Scotch Pine	
<i>Pseudotsuga menziesii</i>	Douglasfir	
<i>Thuja occidentalis</i>	Arborvitae	Smaragd', 'Hetz Wintergreen', 'Sunkist', 'Techny'
<i>Thuja plicata</i>	Western White Cedar	
<i>Tsuga canadensis</i>	Canadian Hemlock	

<i>Metasequoia glyptostroboides</i> *	Dawn Redwood*	‘Gold Rush’
<i>Taxodium distichum</i> *	Baldcypress*	‘Shawnee Brave’

The approved tree list is comprehensive, but subject to annual review with the update of this plan. The list provides the species of tree and its projected crown height when fully mature. Trees are placed in three categories:

Small (mature crown height under 30 feet)

Medium (mature crown height between 30 and 45 feet)

Large (mature crown height over 45 feet)

New Planting Locations. Street trees are a vital part of public infrastructure, reducing stormwater runoff, reducing heat, enhancing property values, and providing wildlife habitat. However, street trees share space with other public infrastructure, requiring careful selection of tree planting locations in the right-of-way. Because of this the following should take place:

Utility marking: The applicant shall call Diggers Hotline to identify the locations of underground utilities before identifying a new location or conducting any ground-disturbing activities.

Utility and Infrastructure Spacing: An appropriate amount of space must be allocated between a new tree planting location and existing infrastructure.

Spacing requirements: Mature tree size and planting site size define the minimum tree spacing requirements. Alternative designs may be approved by the Village Forester.

Large planting sites:

Improved sites greater than or equal to 6.0 feet wide without overhead high-voltage wires

Unimproved sites without overhead high-voltage wires

Medium planting sites:

Improved sites greater than or equal to 4.0 feet wide but less than 6.0 feet wide with or without overhead high-voltage wires

Improved sites greater than or equal to 6.0 feet wide with overhead high-voltage wires

Unimproved sites with overhead high-voltage wires

Small planting sites:

Improved sites greater than or equal to 3 feet wide but less than 4 feet wide with or without overhead high-voltage wires

Vacant Locations. As trees are removed there are various reasons that a planting site is left vacant. When identifying planting locations for a given year, priority will be given to currently vacant locations. An up-to-date record of vacant locations will be maintained in GIS.

Vacant locations may also evolve into ‘no plant’ locations. In that case, the location should be identified as “no plant” in GIS. Village staff will identify a replacement location for any location that has become unplantable.

New Planting Stock. *New public tree plantings will be from nursery grown bare root, containerized, or balled and burlapped tree stock.*

New Subdivisions and Developments. The standards developed in this plan pertain to new developments and subdivisions. This section supplements requirements in municipal code 17.43(5).

Trees should have appropriate spacing between other infrastructure in the right-of-way. The following table provides guidelines for developers:

Infrastructure	Feet
Water meter / vaults	10
Catch basins	10
Gas meters	10
Driveway aprons and crosswalks	10
Fire hydrants	10
Street lights	20
Electrical poles	20
Intersections / corners	45
Railroad tracks	100
Other trees	25-40 feet

Spacing between other trees in the right-of-way is variable depending on the mature height and width based on the species of the nearest tree(s). The desirable distance between trees is 30 feet. At a minimum, a residential lot in a new subdivision should have two right-of-way street trees.

Tree plantings for commercial and industrial development will be required per approved landscape plan, according to municipal code 17.43(5).

Non-Residential Developments. Non-residential developments must have an approved landscaping plan that meets tree standards for parking lots and street trees.

Planting Standards. Appendix A provides standards for planting a new tree, along with a checklist for staff to follow.

Watering. Watering is recommended for a 10-week period following planting. Village contracts will specify 3 supplemental waterings during the growing season spaced 4 weeks apart. The Village of Germantown requests that adjacent property owners supplement the watering. Where there are no adjacent property owners, watering is solely the responsibility of the Village.

Safety. DPW will follow all necessary procedures related to tree maintenance and working in the ROW to ensure the safety of staff, pedestrians, and motorists. Protection measures that will be utilized during forestry operations, include, but are not limited to, signage, traffic control, and barricades.

Work areas will be inspected for hazards like uneven terrain, overhead wires, or nearby structures. Appropriate precautions will be taken to mitigate risks.

If a safety concern is observed, work must stop, and a crew leader or supervisor must be contacted to resolve the issue before continuing.

Tree Pruning and Maintenance of Urban Trees

Pruning Technique. Maintenance of urban trees will be conducted by contracted staff and under the supervision of a certified arborist.

Tree pruning and maintenance of urban street trees is conducted according to ANSI A300 - Standard for Tree Maintenance. The ANSI A300 standard document is a proprietary document that is available in the Department of Public Works and has been incorporated into contract documents.

Pruning Standards and Checklist. Appendix B provides standards for pruning along with a checklist for staff to follow.

Cycle and Budget. There are 3,153 deciduous urban trees identified in the Germantown Geographic Information System (GIS). According to experts, the Ideal pruning cycle for urban municipal trees is somewhere between 5-8 years. A regular maintenance cycle helps to prevent disease, potential damage, allows for proper shaping and thinning, and addresses encroachment in the ROW. Approximately 400-630 trees need to be pruned each year within the Village at a cost of \$80,000 - \$126,000 to meet the recommended maintenance cycle. This plan proposes an initial 9-year cycle to balance budgetary demands of a new program and the need for systematic maintenance. A 9-year pruning cycle would demand a consistent pruning budget of \$70,000. Future planning periods should consider shortening the pruning cycle to fall within the recommended range. As the urban forest grows the commitment to pruning will also grow.

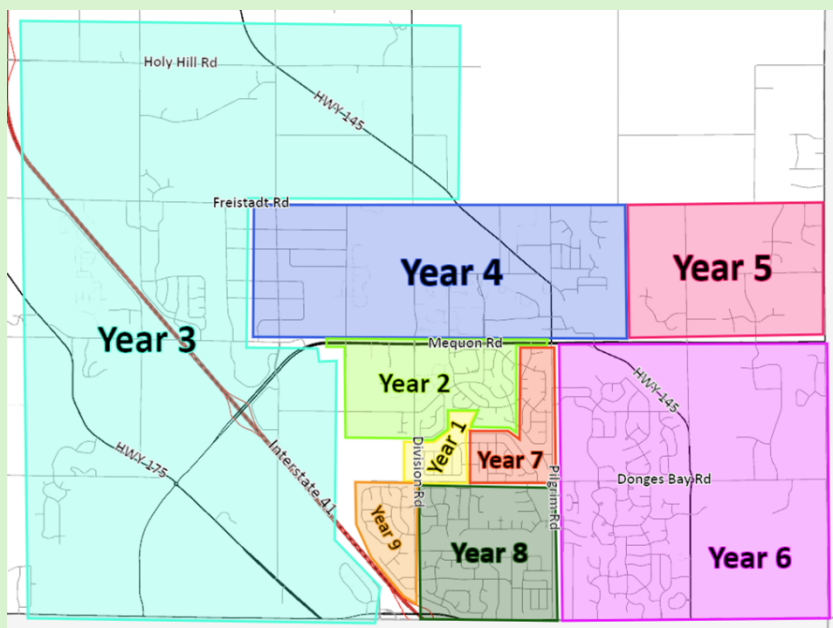


Image 4 - 9-year Cycle: 2024-2033

Treatment: Disease and Insect Control

Assessment and Monitoring. DPW and the Village Forester will complete a comprehensive inventory of all urban municipal trees in a 5-year cycle. The assessment of the tree will factor in all conditions including signs of disease or insect infestation. The condition assessment will flag trees that need an additional treatment feasibility analysis.

Treatment Feasibility Assessment and Integrated Pest Management (IPM). A tree flagged for a treatment feasibility analysis will be reviewed by the Superintendent of Highways, Buildings and Grounds and the Village Forester. Factors in the IPM strategies will include:

- Treatment options available (biological, mechanical, chemical controls)
- Thresholds for treatment based on severity
- The likelihood of successful treatment
- The cost of treatment over time
- The available budget for treatment
- The cost of removal and replacement

Using this multi-factored approach, DPW will determine how to properly care for the tree.

Enhanced Monitoring. When a tree has become diseased or infested and a treatment measure was applied, it will be placed on an enhanced annual monitoring cycle. The effectiveness of treatment will be noted with a new condition assessment. The effectiveness of the treatment will be evaluated, using the same criteria, for continued treatment (if applicable).

Documentation. Documentation of the tree's condition, disease condition, and treatments applied will be updated in GIS.

Tree Pruning and Maintenance of Rural Trees

Maintaining trees in rural areas is essential for safety, aesthetics, and ecosystem health. DPW will follow these guidelines when addressing maintenance of rural trees.

Rural Tree Inventory and Assessment. While a comprehensive inventory and assessment of all rural trees in the ROW is not practical, staff will identify problem trees and problem areas that need to be addressed. Initial assessment will include contributing factors such as the health of

the tree, structural integrity, risk to those in the ROW and on private property, the volume of traffic in a hazard area, and proximity to infrastructure.

Maintenance Plan. Based on the assessment, develop a long-term maintenance plan outlining pruning schedules, tree inspections, and other necessary actions. Maintenance tasks will be prioritized based on urgency, budget constraints, and community needs, considering factors such as tree health, age, species, potential impact to the ROW or private property, and the volume of traffic near the problem area.

Maintenance of rural ROW trees will be conducted primarily by DPW staff, unless specialized equipment or personnel are needed based on complexity of the job, safety, or other factors.

Pruning Guidelines. Follow industry best practices and ANSI A300 standards for tree pruning to ensure safety, tree health, and aesthetic appeal.

Prune trees to remove dead, diseased, or damaged branches, improve structure and form, and reduce hazards such as low-hanging limbs or overhanging branches near roads and utilities.

Avoid excessive pruning, especially topping or lion-tailing, which can weaken trees and promote decay.

Pruning Standards and Checklist. Appendix B provides standards for pruning along with a checklist for staff to follow.

Qualified Personnel and Equipment. Ensure that pruning and maintenance activities are carried out by trained and/or certified arborists, or qualified tree care professionals. All pruning and maintenance activities shall be supervised by an ISA Certified Arborist.

Provide personnel with appropriate safety gear, tools, and equipment, including pruning saws, pole pruners, and safety harnesses.

Where appropriate, for urban trees, ROW tree maintenance will be outsourced to a contractor and supervised by an ISA Certified Arborist.

Timing of Pruning. Schedule pruning activities during the dormant season (late fall to early spring) to minimize stress and promote rapid wound closure.

Avoid pruning during periods of active growth or flowering, as it can increase the risk of disease transmission and excessive wounding.

Planned Tree Removal

Assessment and Evaluation. Prior to initiating tree removal, DPW will conduct a thorough assessment to determine the need for removal. Consideration will be made for factors such as tree health, structural stability, location, proximity to buildings, utilities, roads, cost, and potential risks to public safety. During the process we will evaluate alternatives to removal, such as pruning, treatment, cabling, or other mitigation measures, whenever feasible. The Village Forester will be consulted.

Complexity. Based on the complexity of removal, specifically the size of the tree, the proximity to infrastructure, the public, utilities, etc., DPW may choose to contract out for tree removal.

Safety Measures. DPW will prioritize the safety of personnel, property, and the public throughout the removal process. Staff, assisted by crew leaders, will establish a safe work zone with clear boundaries and signage to alert pedestrians and vehicles to potential hazards. Both DPW staff and/or contracted crews will use appropriate personal protective equipment (PPE), including helmets, gloves, eye protection, chainsaw chaps, and high-visibility clothing.

Removal Plan. Before the tree is removed an assessment of the personnel, equipment and coordination necessary for removal will be conducted. Once the plan has been established a briefing will be conducted at the shop to go over the removal plan and discuss safety. If, for any reason, safety issues cannot be resolved the operation cannot continue until all concerns are addressed. Crew leaders may involve management up to and including the Director of Public Works.

Mobilization. Once the removal plan has been briefed and no issues remain mobilization to the site is able to occur. Crews should ensure that equipment and tools used for tree removal are properly maintained, inspected, and operated by trained personnel. A pre-operation inspection is required for all equipment.

Tree Removal. The removal standards identified in Appendix C will always be followed. Complex removals will be conducted under the supervision of an ISA Certified Arborist.

Communication. DPW will keep residents informed through communications in person, on social media, the Village of Germantown website and, if warranted, local media. Communication with residents will precede the tree removal to the greatest degree possible. The communication to citizens will include the scope of the work and the anticipated schedule. The extent of the Village's communication regarding the removal will be tied to the scope of the tree removal work.

Example 1: Removal of a single ROW tree would result in direct communication with the adjacent property owner only.

Example 2: Removal of five diseased trees in a subdivision will result in direct communication with the adjacent property owner but may also include social media postings.

Example 3: A large-scale removal of trees may involve a variety of communication methods.

Documentation. Documentation of the removal will be captured in work orders (staff time, contractor cost, equipment time) and in GIS. Affected assets in GIS will be updated to reflect the new condition. If the asset was removed, then GIS should be updated to reflect a vacant site or no replant site.

Emergency Tree/Branch Removal

DPW will provide emergency response to deal with damaged trees in the ROW. The emergency response will be timely and ensure the safe removal of branches or trees within the right-of-way in the Village of Germantown to prevent hazards to residents, property, and infrastructure.

Initial Assessment. Upon receiving a report of a fallen tree or damaged and hazardous branches within the village right-of-way, DPW will assess the situation promptly. If during working hours the Superintendent of Highway, Parks, Buildings and Grounds, or his staff, will be notified of the hazard condition. After hours, the call may be taken by Germantown Police Department or the Germantown answering service and DPW will be contacted through normal after-hours emergency procedures. After assessing the situation, using information from the

caller, a determination will be made about the immediacy of the need for the hazard to be mitigated.

Safety Measures. Of primary importance in the initial evaluation is determining the potential impact on safety. Priority remediation efforts will be given to issues that affect resident safety, traffic safety, or the safety of first responders. If any of these conditions exist DPW will treat the remediation efforts as an emergency response which will require a site investigation. If the traveling roadway is affected coordination with Germantown Police Department will also be initiated.

Site Investigation / Evaluation of Hazards.

The evaluation will determine the level of safety precautions that need to be in place, the personnel and equipment needed to address the hazard.

1. Establish a safe perimeter around the affected area to prevent access by pedestrians or vehicles. If necessary, coordinate with local law enforcement to divert traffic away from the area.
2. Assess the size and location of the fallen tree or branches.
3. Determine potential risks to nearby buildings, roads, utilities, and pedestrians.
4. Deploy trained personnel equipped with appropriate tools for tree removal (e.g., chainsaws, safety gear).
5. Coordinate with relevant departments, external contractors and utilities for additional support, if needed.

Tree/Branch Removal. The focus of an emergency response will be to mitigate priority hazards. Depending on the time of day, resources available and extent of the damage, the emergency response from DPW may just address specific hazard and future work at the same site may be scheduled later. Pruning standards identified in this plan will apply to the greatest extent possible.

Communication. DPW will keep residents informed through communications in person, on social media, the Village of Germantown website and, if warranted, local media. With that said, safety is the overriding factor and if time does not allow for communication, outreach will be conducted following the emergency operation.

Documentation. Documentation of the emergency response will be captured in work orders (staff time, contractor cost, equipment time) and in GIS. Affected assets in GIS will be updated to reflect the new condition. If the asset was removed, then GIS should be updated to reflect a vacant site or no replant site.

Permits Required

Any planting, pruning, or other tree maintenance of a tree in the ROW must be permitted, as per Germantown Code 17.60(4). Permits may be obtained at the Germantown Village Hall in the Department of Public Works. Permits will be reviewed by the Superintendent of Highway, Buildings, and Grounds prior to approval. All standards identified in this plan and in the municipal code will be enforced through the permit. Permitted trees planted in the ROW are considered donations to the Village of Germantown and all future maintenance is the responsibility of the Village of Germantown, unless otherwise permitted. Receipt of an approved permit serves as acknowledgement of a permittee's understanding of all applicable standards and acts as an agreement to conduct their permitted work according to those standards.

Upon completion of permitted tree work the permittee will contact the Superintendent of Highway Buildings and Grounds. An inspection of permitted work by the Superintendent of Highway, Building and Grounds will ensure work was completed to standards. The Superintendent of Highway, Building and Grounds may require the permittee to perform additional work to properly conform to standards.

Permits are available at no fee. Non-compliance with a permit or failure to remedy unsatisfactory work will result in a penalty per municipal code 17.60(12).

Determinations made by staff related to permit denials may be reviewed by the Tree Board.

Adjacent Landowners Responsibility. No person shall remove, trim, cut roots, or disturb any ROW tree, park tree or other public tree without a permit.

Homeowners Associations (HOA). HOA's may annually apply for permits for pruning, planting, or other tree maintenance, in the ROW on behalf of their members who have properties adjacent to ROW trees. The Village of Germantown will not approve permit requests from an HOA that do not address ROW trees in the HOA holistically. Permitted work will be performed according to these standards, and subject to inspection, corrective action and penalties as described above under "Permits". The permitted work will be conducted at the cost of the HOA. Planted trees in the ROW become the property of the Village of Germantown. The permitted work of HOA's must be coordinated with the Superintendent of Highway, Buildings and Grounds.

The Tree Board

The tree board will be established and act in accordance with municipal code 17.60.

Members. The Tree Board will consist of three members:

- A Village Trustee
- The Village Forester, and
- A citizen from the Village of Germantown

Terms. The Village Trustee and citizen members will serve two-year staggered terms. Upon plan adoption the citizen member will serve an initial two-year term. The Village Trustee will serve an initial one-year term. Subsequent term(s) of the Village Trustee will be two-year terms.

Appointment. The Village President will nominate the Trustee member and the citizen member to serve two-year terms. The appointments will be confirmed by the Village Board.

The Village Forester will remain on the Tree Board to coincide with his/her ongoing appointment to the Village Forester position.

Advisory Role. Except as noted below, the Tree Board serves in an advisory capacity to the Public Works and Highway Committee. Contracts for tree maintenance and planting are ultimately approved by the Public Works and Highway Committee and/or the Village Board, depending on the value of the contract.

Scope of the Tree Board

Annual Operations and Maintenance Plan Review - The Department of Public Works will make an annual presentation to the Tree Board which will consist of the plan for the current year operation, the communication plan, and the 5-year plan. The Tree Board will make a recommendation to the Public Works and Highway Committee regarding the approval of the annual operations plan and 5-year plan.

Comprehensive Tree Plan Review – As the Comprehensive Tree plan is revised time-to-time, it will be brought to the Tree Board for review.

Appeals of Determinations and Orders - The Tree Board may convene, as required by municipal code 17.60 (9), to review an appeal of a determination or order made by staff. At such hearing the Tree Board may reverse, affirm, or modify the order of the determination appeal. The grounds for its decision shall be stated in writing. The Tree Board shall by letter notify the party appealing the order or determination of its decision within 10 days after the hearing has been concluded and file its written decision with the Village Clerk. The decision of the tree board is final and not subject to additional appeal.

Plan Review and Community Outreach

Comprehensive Tree Plan Review. This plan will be reviewed annually.

Community Outreach. Community outreach regarding the annual operations for tree planting and maintenance will be conducted in numerous ways.

1. Letters will be sent to property owners with adjacent ROW trees outlining the type of tree maintenance they can expect and the anticipated timing of the work. Outreach letters will precede any tree work by a minimum of three weeks.
2. Village of Germantown social media will announce all work.
3. The Village of Germantown website will announce all work as an alert and post the annual operations plan, the 5-year plan and the Comprehensive Tree Plan.

Continuous Monitoring and Feedback. DPW will Monitor the health and condition of pruned trees over time, observing growth patterns, pest infestations, and response to pruning

treatments. The annual operations plan and the 5-year plan may need to be adjusted based on new conditions.

Feedback from residents will be tracked by DPW. Solicit feedback from residents and stakeholders regarding the effectiveness of maintenance efforts, responsiveness to concerns, and overall satisfaction with the rural tree management program.

Comprehensive Tree Plan – Appendix A

Tree Planting Standards Checklist

- ☐ Notify affected residents, property owners, and stakeholders in advance of planned tree planting activities.
- ☐ Provide clear and transparent communication about the reasons for planting, proposed timelines, and any mitigation measures or alternatives considered.
- ☐ Prepare planting holes of appropriate size and depth, typically two to three times the width of the root ball.
- ☐ Handle trees with care to avoid damage to roots, branches, or trunk.
- ☐ Remove packaging materials and gently loosen or remove any circling roots before planting.
- ☐ Position the tree in the center of the planting hole, ensuring that the root collar is level with or slightly above the surrounding soil surface.
- ☐ Backfill the hole with native soil, avoiding the use of excessive amendments or fertilizers.

- ☐ Create a shallow watering basin around the base of the tree to facilitate irrigation.
- ☐ Water newly planted trees thoroughly immediately after planting to settle the soil and promote root establishment.
- ☐ Provide regular watering during the first growing season, especially during periods of drought or high temperatures. Watering should be weekly in the initial 3 months of the planting.
- ☐ Apply a layer of organic mulch (e.g., wood chips, bark) around the base of the tree, leaving space around the trunk to prevent moisture buildup and potential decay.
- ☐ Mulch should be spread evenly to a depth of 2-4 inches to conserve soil moisture, regulate soil temperature, and suppress weed growth.
- ☐ Clean up the planting location so it is clear of excess materials, packaging, equipment, etc.
- ☐ Evaluate the need for staking based on the size, species, and site conditions of the newly planted tree.
- ☐ Use flexible, non-abrasive materials for staking to minimize damage to the trunk and branches.
- ☐ Install stakes at a slight angle away from the tree, securing them firmly but not tightly to allow for natural movement.
- ☐ Monitor the tree regularly and remove stakes and support systems once the tree has established sufficient root anchorage.
- ☐ Record the tree species, planting dates and condition assessment in GIS.
- ☐ Establish a monitoring schedule to track the growth and health of newly planted trees over time.
- ☐ Use collected data to evaluate the success of tree planting initiatives and inform future planning and management decisions.

Comprehensive Tree Plan – Appendix B

Tree Pruning Standards Checklist

- ☐ Notify affected residents, property owners, and stakeholders in advance of planned tree pruning activities.
- ☐ Provide clear and transparent communication about the reasons for pruning, proposed timelines, and any mitigation measures or alternatives considered.
- ☐ Use properly maintained and sanitized pruning tools to minimize the spread of disease pathogens.
- ☐ Inspect equipment before pruning activities are initiated.
- ☐ Ensure that pruning tools are sharp and properly adjusted to make clean, precise cuts.
- ☐ Assess potential hazards such as falling limbs, overhead wires, or pedestrian traffic before initiating pruning activities.
- ☐ Use appropriate personal protective equipment (PPE), including helmets, gloves, eye protection, and high-visibility clothing.

- ☐ Secure work areas with warning signs, cones, or barriers to alert pedestrians and vehicles to the presence of pruning crews.
- ☐ Conduct routine pruning during the dormant season (late fall to early spring) to minimize stress and promote rapid wound closure.
- ☐ Address immediate safety hazards or emergency situations promptly, regardless of the season.
- ☐ Use proper pruning techniques to minimize damage and promote healing. Follow the ANSI A300 Standard at all times.
- ☐ Make clean, smooth cuts just outside the branch collar to facilitate compartmentalization and minimize the risk of decay.
- ☐ Avoid leaving stubs or making flush cuts, as they can impair wound closure and lead to long-term health issues.
- ☐ Prioritize the removal of dead, diseased, or broken branches.
- ☐ Identify and correct structural defects such as co-dominant leaders, included bark, and narrow crotch angles.
- ☐ Maintain a balanced canopy by selectively thinning overcrowded or crossing branches.
- ☐ Avoid excessive pruning of healthy green foliage, as it can stress the tree and compromise its ability to photosynthesize.
- ☐ Clean-up after pruning as is appropriate for the location of the pruned tree. Urban street tree clean-up may be more extensive than rural street tree clean-up activities.
- ☐ Maintain records of pruning activities, including the date, location, reasons for pruning, and specific pruning cuts made in GIS associated with that asset.
- ☐ Document any observed signs of pest infestations, diseases, or other tree health issues through an updated condition assessment in GIS.

Comprehensive Tree Plan – Appendix C

Tree Removal Standards Checklist

- ☐ Notify affected residents, property owners, and stakeholders in advance of planned tree removal activities per plan requirements. In emergency situations prioritize safety with secondary notifications, if advance notification is not possible.
- ☐ Provide clear and transparent communication about the reasons for removal, proposed timelines, and any mitigation measures or alternatives considered.
- ☐ Conduct a thorough assessment of the tree to determine the need for removal.
- ☐ Consider factors such as tree health, structural stability, location, and potential risks to nearby structures, utilities, and pedestrians.
- ☐ Evaluate alternatives to removal, such as pruning, cabling, or other mitigation measures, whenever feasible.
- ☐ Establish a safe work zone with clear boundaries and signage to alert pedestrians and vehicles to potential hazards.
- ☐ Use appropriate personal protective equipment (PPE), including helmets, gloves, eye protection, chainsaw chaps, and high-visibility clothing.

- ☐ Ensure that equipment and tools used for tree removal are properly maintained, inspected, and operated by trained personnel. Conduct a pre-operation check of all tools and equipment.
- ☐ Use specialized equipment such as chainsaws, ropes, and rigging gear as needed to safely remove trees in confined spaces or near structures.
- ☐ Employ safe and efficient tree removal techniques based on the size, species, and condition of the tree.
- ☐ Consider the use of directional felling, piecemeal dismantling, or crane-assisted removal methods to minimize risks and damage to surrounding property.
- ☐ Minimize impacts to the surrounding environment, including nearby vegetation, wildlife habitat, and soil integrity.
- ☐ Implement erosion control measures as needed to prevent soil erosion and sedimentation during removal activities.
- ☐ Dispose of tree debris and wood waste as appropriate, according to the location. Clean-up in urban areas may be more extensive than clean up in rural areas.
- ☐ Consider opportunities for composting, chipping, or repurposing tree materials to minimize waste and support sustainable resource management practices.
- ☐ Remove all debris, logs, and branches from the removal site promptly after completion of the work.
- ☐ Restore disturbed areas to their original condition or implement revegetation measures as needed to prevent soil erosion and promote site stabilization.
- ☐ Maintain accurate records of tree removal activities, including the date, location, reasons for removal, and methods used. The location should be updated in GIS to reflect the vacancy.
- ☐ Document any observed signs of pest infestations, diseases, or other tree health issues that may have contributed to the need for removal.⁴

Comprehensive Tree Plan – Appendix D - Budget

Required Forestry Annual Budget

Historical Forestry Budget

Forestry Consultant	\$15,000
Emerald Ash Borer Treatment	\$10,000
Tree Planting	\$35,000
Contracted forestry work / contracted pruning	\$40,000
Total	\$100,000

Necessary Budget* per Comprehensive Plan

Forestry Consultant	\$20,000
Emerald Ash Borer Treatment	\$10,000
Tree Planting	\$35,000
Tree Pruning	\$70,000
Contracted forestry work	\$20,000
Total	\$155,000

*This budget is presented in 2024 dollars and will need annual adjustments for inflation

Comprehensive Tree Plan – Appendix E

Non-Residential Development Street Tree Requirements

Quantity of Trees. Determining the quantity of street trees required adjacent to a development depends on the species size, the width of the right-of-way (ROW), and the length of ROW. The developers plan shall utilize the approve species listed in the Comprehensive Tree Plan and the spacing outlined below:

<u>Tree Size</u>	<u>Small</u>	<u>Medium</u>	<u>Large</u>
Spacing	25-30'	30-40'	50'
Minimum ROW Width	5'	5-8'	8+'

Additional spacing requirements are addressed below and may affect the quantity of trees adjacent to a development. The plan will be reviewed and approved by the Village Forester.

Geographic Information Systems. The Village requires all new street trees to be recorded in the Village geographical information system (GIS). Newly added street trees will be added to the Village GIS at a cost to the developer where the Village will bill for actual costs to update the system.

Variety. Developers are encouraged to present plans that include a variety of approved species. The variety of species is subject to approval of the Village Forester.

Specification for Planting Street Trees

- All plant material shall be true to name and type, and first-class representatives of their species or variety. They shall have normal, well-developed branches, be healthy, vigorous plants free from defects, plant disease, and all forms of infestation or objectionable disfigurements. Either bare root, containerized, or balled and bulapped trees are acceptable. All plant material shall conform to American Standard for Nursery Stock (**ANSI Z60.1 - 2004**).
- The street trees shall be centered between the back of the curb and the street side of the existing or future sidewalks (if no walk is planned, it will be centered in the right-of-way). Spacing of trees from various infrastructure and features of the right-of-way are addressed in the Comprehensive Tree Plan (above).
- If there is not sufficient space to plant street trees in the right of way developer may plant an equal number of trees on private property. This will be accounted for in the developer's landscape plan. Any trees planted on private property will be maintained by the developer or owner.
- All street trees planted shall be of minimum size of 2" in caliper for containerized and balled and burlapped trees and 1 ¾" for bare root trees.
- The size for the tree installation hole shall be a minimum of 36" in diameter. Trees shall be planted with the root collar exposed at or slightly above the surface level. For balled trees, the hole shall be at least 18" larger than the largest diameter of the ball and no deeper than the ball. Remove twine, clip and fold back wire basket and trim burlap.
- Soil for backfilling around roots and/or root balls shall be the existing soil from the excavation. Where existing soil is rocky and poor quality, the local brown topsoil may be used. Soil shall be pulverized and screened. All material dug from the plant holes and not used shall be removed from the site and disposed of. Immediately after planting, soil around roots and balls shall be thoroughly watered.
- At the time of planting, trees shall be pruned only to remove dead, broken, or diseased branches or cross branches that rub. As much of the crown as possible shall be maintained to create food for the tree. Trees shall appear symmetrical in shape and appearance.
- Persons installing street trees shall take all necessary precautions to minimize the damage to existing lawns. Any damage to existing lawns shall be repaired by placing topsoil and seed in the damaged area. The final determination to be made by the Village Forester.

- Upon completion of planting, individual planting holes shall be outlined with a shoulder of soil, placed outside of the planting hole rim to form a saucer. Wood mulch material shall be placed to cover disturbed areas to a minimum depth of three (3) inches, but there will be an air gap 1" wide around the base of the trunk with no mulch to keep the root flare exposed.
- Street trees do not need to be staked, unless required by the Village Forester due to size or species. If staking is required, a minimum of two wood posts that have a minimum diameter of 2½" shall be used. The minimum length of the posts shall be the depth of the bore plus one-half the height of the tree. The posts shall be installed at least one foot outside the diameter of the tree planting hole. The tree shall be connected to the posts with a 2" x 1/16" strap of such design so as not to damage the tree. The straps shall be located midway between the base of the trunk and the point where branching occurs. The tree shall be planted as plumb as possible and the contractor shall maintain tree plumbness throughout the guarantee period. All stakes shall be removed within one year of planting.
- Street trees planted between June 15 and September 15 should be avoided. If it cannot be avoided trees shall be balled and burlapped. These trees shall also be on a maintenance watering schedule, if natural rainfall is not sufficient during this time period.
- All installations must be inspected by the Village Forester, or a representative. If, in the sole opinion of the Village Forester, additional remedies are needed to assure the stocking and maintenance of healthy tree specimens, additional remedies may be required.
- Street trees installed by a developer shall be guaranteed for one (1) year. Replacement trees after one shall be the responsibility of the Village.
- The Village Forester may add to or delete from the list of approved trees. This may include trees that have come under attack from insects or disease that should not be planted. This information may come from DNR Forest Health or UW Extension staff or alerts.

Note: Refer to the DNR guidelines for current planting specifications.

[Urban Tree Planting Resources](#) | [Wisconsin DNR](#)

Comprehensive Tree Plan – Appendix F – Permit Application

Application for Permit to Prune, Remove, Plant or Treat Tree(s) on Public Property within the Village of Germantown.

Property Owner/Homeowners Association:

Date: _____

Address: _____

Phone: _____

Permit is requested to _____ (prune / treat / remove / plant) a tree or trees.

Location of tree(s)

Type and approximate trunk diameter of tree(s):

If the permit is for pruning or removal, please state the reason for action. If the permit is to plant a tree, please identify the type and size of tree to be planted. If the permit is to spray, please state the chemical to be used and follow directions on the label.

Who will do the work? _____

(If someone other than the property owner, then a License must also be obtained) It is understood and agreed that if this application is granted, then the property owner will have the work done in a workmanlike manner, comply with any special instructions stated in the Comprehensive Tree Plan, remove from the street all debris and dirt and replace the paving and lawn and leave them compatible with the surrounding landscape. It is further agreed that the applicant will save the Village its officers, employees, and agents free and harmless from all damage to life, limb and property arising from the proposed work and as well as damage to nearby and abutting property. It is further agreed that the applicant will comply with all provisions of the ordinances of the Village of Germantown and with the laws of the State of Wisconsin.

Applicant's signature (if an individual):

Authorized agents signature and title (if an HOA):

- - - - - Staff Notes:

Permit is approved _____ Permit is denied _____ Permit No:

DPW Staff Signature:

Comprehensive Tree Plan

Log of Suggested Municipal Code Changes

Needed to prevent conflict in code/plan:

Change 1: Section 1.215 (4) refers to a Master Street Tree Plan. Section 17.60(3) refers to a Comprehensive Tree Plan. Section 1.215(4) should be updated to replace “Master Street Tree Plan” with “Comprehensive Tree Plan”.

Change 2: Subchapter II – Boards and Commissions

A section on the Tree Board needs to be created consistent with the draft Comprehensive Tree Plan.

Change 3: Section 1.214 (2) change the supervision of the Village Forester to the Director of Public Works.

Change 4: Section 17.6(4)(b) should be modified to indicate that applications may be obtained from the Village website and from the Department of Public Works.

Change 5: Section 17.60(4)(d) should be modified to the appropriate fee amount.

Change 6: Section 17.43 (5)(c)(1) should be modified so the caliper matches the Comprehensive Tree Plan.

Other Recommendations:

- Officially appoint a Village Forester
- Section 17.60(6)(a) more appropriately belongs in Section 17.60(5).
- Section 17.60 more appropriately belongs in Chapter 8 – Public Works

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: August 14, 2024

PLACEMENT: Action Item

ITEM TITLE: Award of Kinderberg splash pad repairs to Carrico Aquatics for an amount not to exceed \$57,800 from accounts 91591000-592100 and 10591000-1000.

SUBMITTED BY: Gil Standridge, Park & Rec Director

SUMMARY EXPLANATION:

I am requesting the Public Works and Highway Committee allow me to contract Carrico Aquatics to replace Kinderberg Park splash pad mechanical room equipment, out of account 91591000-592100, for \$57,800 for which \$55,000 was approved through the ARPA budget. The additional \$2,800 would come out of the Recreation & Maintenance expense for spray pad account, 10591000-1000. Please note the three proposals included in this packet for a breakdown of mechanical equipment needed.

This committee should be made aware that these improvements for the mechanics of the splash pad do not include media blasting (\$16,292.00) or surface painting (\$11,466) based on 2024 pricing. These figures will have to be requested in the 2025 budget. My recommendation to the Parks and Recreation Commission will be to sandblast the current paint down to the concrete surface and leave without repainting. Many Villages/Cities throughout are leaving the surface of the splash pad with bare concrete, which meets industry standards, but at a large savings to the Village.

ATTACHMENT:

1. Carrico Aquatics Proposal
2. Letter to Public Works Highway Committee- Splashpad

STAFF RECOMMENDATION:

Award of Kinderberg splash pad repairs to Carrico Aquatics for an amount not to exceed \$57,800 from accounts 91591000-592100 (\$55,000) and 10591000-1000 (\$2,800).

ACTION BY Committee:



July 31, 2024

Guilford Standridge
Village of Germantown
N122W17177 Fond Du Lac Avenue
Germantown, Wisconsin 53023

RE: Mechanical Room Equipment

Dear Guilford,

Thank you for allowing Carrico Aquatic Resources, Inc. the opportunity to work with the Village of Germantown and provide a proposal for mechanical room equipment for the splash pad.

Splash Pad Mechanical Room Equipment:

- (1) Pentair Triton 100 Filter with multiport valve and AFM filter media
- (1) 1HP, 1PH 115/230V Circulation pump with spare basket
- (1) 10HP, 1PH, 230V Main feature pump with spare basket
- (1) 1HP, 1PH 115/230V Small feature pump with spare basket
- (1) ChlorKing UV disinfection system with EZ Clean strainer
- (1) BECSys5 Chemical controller
- (1) BECSys Autofill system with 1" ASCO solenoid
- (2) 2" FloVis flow meters
- (1) Pulsar Precision 30 chlorine feeder
- (1) Stenner peristaltic pump for acid feed
- Demolition and disposal of all existing equipment
- Installation, start-up, programming and operator training
- All required state engineered plans, permits and inspections
- Shipping

Your total investment for the above listed is fifty-seven thousand eight hundred and no/100 dollars (\$57,800.00).

The Village is responsible for installation of the autofill solenoid in the domestic water line as well as all necessary electrical and data connections. Any local permits, if needed, are the responsibility of the Village.

Terms for this sale are:

- Prices are firm for 30 days from date of this proposal.
- Terms of payment requested is 30 days from the date of our invoice after delivery.
- Past due accounts will be charged a late fee of 1.5% per month.
- This price does not include taxes.

If you have any questions, please feel free to contact our office toll free at 800-832-7147. If you find this proposal acceptable, please indicate below and email a copy **cory@carricoaquatics.com**.

Thank you,

Cory Hintze
Account Manager
Carrico Aquatic Resources, Inc.

ACCEPTANCE OF PROPOSAL

Accepted by: _____ Date: _____ P.O.# _____



Germantown Park and Recreation Department

N112W17001 Mequon Rd

P.O. Box 337

Germantown, Wisconsin 53022-0337

(262)250-4710 Fax (262)255-2920

Information Line (262)250-4711

Meeting Date: August 14, 2024
To: Public Works & Highway Committee
From: Gil Standridge, Park and Recreation Director
RE: Approval to Contract Carrico Aquatics for Splashpad improvements

I am requesting the Public Works and Highway Committee allow me to contract Carrico Aquatics to replace splash pad mechanical room equipment, out of account 91591000-592100, for \$57,800 for which \$55,000 was approved through the ARPA budget. The additional \$2,800 would come out of the Recreation & Maintenance expense for spray pad account, 10591000-1000. Please note the three proposals included in this packet for a breakdown of mechanical equipment needed.

Public works has worked with Carrico in the past and trusts the quality of their parts and workmanship. Three companies were asked to provide a quote for the mechanical parts needed. CAS Commercial Aquatic Services Inc. submitted a quote for \$61,150.00. Spear Corporation provided a quote of \$72,250.00. That put Carrico at the lowest cost at \$57,800.00. With these mechanical room equipment improvements this should increase the life of the splashpad another ten years.

This Committee should also be made aware that these improvements for the mechanics of the splashpad do not include media blasting (\$16,292.00) or surface painting (\$11,466) based on 2024 pricing. These figures will have to be requested in the 2025 budget. My recommendation to the Parks and Recreation Commission will be to sandblast the current paint down to the concrete surface and leave without repainting. Many villages/cities throughout are leaving the surface of the splashpad bare concrete which meets safety standards, and a huge savings.

Carrico can order the parts and start to replace the mechanical room equipment during September after the Splashpad is closed for the season. Therefore there will be no interruption of service to the public.

Thanks in advance for your consideration on this matter.

Regards,

Gil Standridge
Parks and Recreation Director
Village of Germantown

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: August 14, 2024

PLACEMENT: Action Item

ITEM TITLE: Authorization to temporarily overfill Water Utility staffing by one position from September - December 2024.

SUBMITTED BY: Paul Haugen, Water Superintendent

SUMMARY EXPLANATION:

As part of a succession plan to replace the Water Utility Foreman, staff are seeking approval for an overfill of the total positions authorized in the Water Utility. The overfill will be used to hire a new operator while an existing operator has shifted to shadowing the Foreman in anticipation of a promotion. The overfill allows for a smoother transition in leadership while not losing front line capabilities in the Water Utility. The temporary overfill will last until the Foreman's retirement in December. The fiscal impact of to overfill will be approximately \$35,856. This impact has been reviewed by the Finance Director without objection.

ATTACHMENT:

STAFF RECOMMENDATION:

Approval for the temporary overfill of one position in the water utility.

ACTION BY Committee:

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: August 14, 2024

PLACEMENT: Action Item

ITEM TITLE: Award of Fireman's Park restroom, exterior and interior painting project to MACORP, LLC for an amount not to exceed \$9,082.00 from capital account 40564000-592300.

SUBMITTED BY: Scott Anderson, Superintendent

SUMMARY EXPLANATION:

As reflected in the 2024 Parks non-borrowed capital budget, funds were allocated to paint the exterior and interior of the Firemen's Park seasonal restroom shelter. This project is being completed in conjunction with a new roof, and the tuckpointing and resealing of the exterior split-faced block. Staff has solicited pricing from area contractors and the results are listed below.

MACORP LLC: \$9,082.00

Service Painting Corporation: \$10,500.00

ATTACHMENT:

STAFF RECOMMENDATION:

Staff recommends contracting with MACORP LLC to complete the painting project for an amount not to exceed \$9,082.00. If approved, funds shall be allocated from the Buildings & Grounds non-borrowed capital account: 40564000-592300.

ACTION BY Committee:

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: August 14, 2024

PLACEMENT: Action Item

ITEM TITLE: Award of library copula roof leak repair to Noffke Roofing in amount not to exceed \$23,500.00 from capital account 40564000-592300.

SUBMITTED BY: Scott Anderson, Superintendent

SUMMARY EXPLANATION:

The library roof was replaced in the fall of 2021. Since that time and during periods of significant temperature change accompanied by precipitation, a leak forms in the community room. While this leak isn't a common occurrence, when it occurs, it can cause disruption, especially if library programming is underway. If not addressed, staff is concerned about damage to insulation, drywall and even mold on the interior of the building.

On several occasions, staff has worked closely with the roofing contractor who completed the project in 2021. Testing the area with water has not identified deficiencies within the shingled area, which would have been included in the original project scope. The original contractor has worked to help identify the leak, at no additional cost to the village.

Around 2012, staff had identified a significant leak near the library's main entrance, which was eventually determined to be a oversight during the original construction of the building. At that time, staff had worked closely with Noffke Roofing, who specializes in the repair of troublesome issues. Recently, staff met with Noffke regarding the situation over the community room. A plan has been formulated to remove all of the shingles around the perimeter of the copula. This will allow for inspection of roof deck and flashings on the copula wall, where it's suspected the leak may originate. The project will inspect the top of the copula and replace deficient shingles as needed. The project will also include a new and larger finial near the lightning rod.

While this project is specifically unbudgeted, there are funds remaining from a project that was significantly scaled back at Haupt Strass Park. Staff recommends using these remaining park funds to cover the cost of this project.

ATTACHMENT:

STAFF RECOMMENDATION:

Staff recommends contracting with Noffke Roofing to complete the repairs associated with the leak on the library in an amount not to exceed \$23,500.00 and to forward this request onto the Village Board with a positive recommendation. If approved, funds shall be allocated from the Parks borrowed capital account: 40564000-592300.

ACTION BY Committee:

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: August 14, 2024

PLACEMENT: Action Item

ITEM TITLE: Award of Fireman's Park standing seam roof project to JK Contractors in an amount not to exceed \$19,060.00 from capital account 40564000-592300.

SUBMITTED BY: Scott Anderson, Superintendent

SUMMARY EXPLANATION:

As reflected in the 2024 Parks non-borrowed capital budget, funds were allocated in the amount of \$22,000.00 to replace the asphalt shingled roof on the Firemen's Park seasonal restroom shelter. The roof will be replaced with a standing seam metal roof, similar to the roof of the new shelter and band shell. Included in the project scope is the addition of gutters and downspouts to move water away from the building. This project is being completed in conjunction with the tuckpointing and resealing of the exterior split-faced block, and an exterior / interior painting project. Staff has solicited pricing from area contractors and the results are listed below.

JK Contractors:	\$19,060.00
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Murphy's Exterior Construction:	\$23,632.76
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ATTACHMENT:

STAFF RECOMMENDATION:

Staff recommends contracting with JK Contractors to complete the roof replacement project for an amount not to exceed \$19,060.00 and to forward this request to the Village Board with a positive recommendation. If approved, funds shall be allocated from the Buildings & Grounds non-borrowed capital account: 40564000-592300.

ACTION BY Committee:

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: August 14, 2024

PLACEMENT: Presentation

ITEM TITLE: Review of Development Handbook Update

SUBMITTED BY: Matthew Mortwedt, Public Works Director

SUMMARY EXPLANATION:

In 2020, the Development Handbook was last updated. The copy presented included multiple reviews by staff. Revisions are indicated by color and tracking methods.

Staff realizes that the Committee members have not had an extensive amount of time to review the Handbook. Given that, this item is intended to discuss/present the handbook and answer any questions. We will bring the item for approval in September.

Following adoption of the revised handbook, staff will conduct an annual review to determine if additional changes are needed. The annual review process should eliminate the need for more time consuming revisions like the one we just undertook.

ATTACHMENT:

1. Ex A - Change Log 2024
2. Ex B - RED LINE Development Handbook FOR 2024 REVIEW
3. 2024 Development Handbook 8-9-24 with Details

STAFF RECOMMENDATION:

No action required.

ACTION BY Committee:

0.0 Changed cover page to reflect anticipated acceptance dates.

1.1.1 Added clarification for approved electronic plan submission. Plans may be submitted electronically **on a flash drive or through a file sharing program** and/or on 11-inch x 17-inch paper if approved by Director of Public Works. **If submitted electronically, the drawings shall be a .pdf file type.**

1.1.2 Updated datum to NVGD 1988. (~~NGVD 1929~~)

1.7.1.3 Added **All sanitary sewer drawings shall include a Lateral Table. The table must show all lengths of sanitary sewer laterals and confirm clearance underneath future footing elevations.**

Numbering for section 2 needs to be redone completely prior to publication.

2.ii.1.a.1 Added **Crosslinked polyethylene PEXa, SHOWED BETTER DURABILITY**

2.iii.2.c Removed and replaced reference to a “Figure 20” with **Install check dam with bentonite chips 2 feet thick across the full width of the trench and 4 feet above pipe crown.**

WATER MAINS WITH CHECK DAMS ON LONG LENGTHS, check with cedar about creating a spec.

2.iv.1.a.ii Added **Kennedy** as an acceptable valve option.

2.iv.1.b.i Removed ~~Glow R/W~~ from the list of acceptable valves.

2.v.1.j Added **The contractor will make Final alignment to the valve box after binder and before the final lift of asphalt.**

2.vi.2.c Detail 21? Seems to be another ghost figure.

2.VII.1.a Removed ~~Glow Medallion UL/FM~~ and ~~U.S. Pipe Sentinel 250~~ from the acceptable manufacturers list and added **Mueller A-403 Super Centurion** and **Mueller Super Centurion UI/FM**

2.vii.1.e Added **Hymax H-304**

2.viii.1.h Removed ~~Glow Water Systems, Co.~~ and added **“Or approved equal”** to the list of acceptable ductile iron fitting manufacturers.

2.viii.1.i.iii Added **Stainless steel rodding with stainless steel star bolts.**

2.ix.1.c Added **“(4 livable units and over)”**

2.ix.1.f.ii Not sure what needs to be done here, clarification needed.

Irrigation/Sprinkler meter changes, new figure.

2.xi.3.k Replaced **“top”** with **“full gate valve box”**

2.xii.1.b Removed ~~Power Seal 3480M-J CS Tapping Sleeve~~ and added **Ford and Hymax** as accepted tapping sleeves.

32.3.ii.1 Added **Hymax** as an approved stainless steel repair clamp.

42.2.ii.2 Changed ~~Water Utility~~ to Contractor and added “The samples will be taken to a State Certified lab, the water will not be turned back on for new main construction, new development, or new facilities until the Water Utility receives the sample test results.”

42.2.iii.2.c Added engineer.

42.2.iii.2.f Added onsite inspector.

3.1.4.1.1.A Added up to 5/8” allowable sizing of limestone chips.

3.1.4.1.1.B Added up to 5/8” allowable sizing of limestone chips.

3.1.5.1.7 Removed.

3.1.5.1.8 Removed.

3.1.5.1.9 Removed.

3.1.5.1.13.B Added “in a continuous circle”

3.1.5.1.20.A Added “less 1/4”

3.1.5.2.10 Added “less 1/4”. 2”

3.1.5.2.17 Added “Wastewater”

3.1.6.2.10 Removed “and detail figure 20”

3.1.7.1.4.B Specified Fernco Strong Back connector

3.1.9.2.3 Removed.

3.1.12.1 Replaced ~~Engineering Services Division~~ with Village Engineer

3.2.1.6 Added “Superintendent”

3.2.1.6.4 Replaced ~~Utility Department~~ with Wastewater Utility

3.2.2.1.4 Specified Fernco Strong Back connector

3.3 Replaced ~~Utility Department~~ with Wastewater Utility

3.3.3.1.1 Added “a mechanical plug of appropriate size will be installed at the furthest downstream manhole”

3.3.3.4 Added “by the Village” and replaced the Utility ~~Department~~ with Wastewater Utility.

3.3.4.1 Replaced ~~has the option to contract directly with the Utility Department for performing CCTV inspection.~~ with will perform CCTV after construction is complete.

4.1.2.2.1 Change minimum size from 6” to 8” diameter.

4.1.11 Discuss comment and how to clarify in handbook: Ensure that frame / grate is matched to the appropriate size concrete structure. This has been problematic in the last few projects / developments. 3501 sits on a 24x30” basin, 3228 sits on a 24x36” basin.

4.1.12.1.1.A Removed.

5.2.9.3.5. Prior to applying curing material on the concrete, the face of the curb shall be stamped with the contractor's name and year of installation. A stamp is required for each non-contiguous section of curb and gutter.

5.2.11.1.6 Added "approaches"

5.2.11.4.2 Added "approaches"

5.2.13.3.4. Prior to applying curing material on the concrete, the face of the side path shall be stamped with the contractor's name and year of installation. A stamp is required for each non-contiguous section of side path.

6.3.1.1 Updated record drawings size and display requirements to 24x36" and Plan and Profile.

6.3.1.2.9 Added a requirement for A table of quantities for all utilities shown on each sheet.

6.3.1.6 Added and easements with record numbers

6.3.1.11 Added and show adjacent As-Built record drawing file numbers.

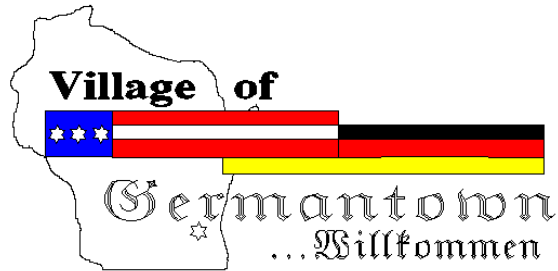
6.3.1.14 Updated wording to be consistent with other requirements.

6.3.1.16 Removed ~~GD~~ specification and updated required datum to NAD 1983.

6.3.2.7 Updated vertical datum to NVGD 1988

6.3.3.8.8 Require depth of cover.

6.3.5 Created an ELECTRICAL SYSTEM subsection to better define requirements of electrical system record drawings.



DEVELOPMENT HANDBOOK

VILLAGE OF GERMANTOWN INFRASTRUCTURE STANDARDS

Approved by:

Public Works & Highway Committee – June 5, 2024

Village Board – June 17, 2024

~~Drafted By:~~

~~Ryan Ehlerding, P.E.~~

~~Civil Engineer~~

~~Reviewed by:~~

~~Lawrence Ratayczak, P.E.~~

~~Public Works Director~~

~~February 12, 2020~~

CONSTRUCTION PLAN REQUIREMENTS 7

TABLE OF CONTENTS

1 CONSTRUCTION PLAN REQUIREMENTS

- 1.1 GENERAL
- 1.2 PLAN REVIEW
- 1.3 MASTER GRADING AND DRAINAGE PLANS
- 1.4 EROSION CONTROL PLAN
- 1.5 STORM WATER MANAGEMENT PLAN
- 1.6 STORM SEWER PLANS
- 1.7 SANITARY SEWER AND WATER MAIN PLANS
- 1.8 ROADWAY PLANS (includes Street Lighting Plans)
- 1.9 PRELIMINARY PLAT
- 1.10 FINAL PLAT
- 1.11 PLAN SET SUBMITTAL SCHEDULE

2 WATER SYSTEM

- 2.1 SPECIFICATIONS
- 2.2 ABANDONMENT
- 2.3 INSPECTION

3 SANITARY SYSTEM

- 3.1 SPECIFICATIONS
- 3.2 ABANDONMENT
- 3.3 INSPECTION

4 STORM SYSTEM

- 4.1 SPECIFICATIONS
- 4.2 INSPECTION

5 ROAD SYSTEM

- 5.1 GEOMETRICS

5.2 SPECIFICATIONS

5.3 INSPECTION

5.4 STREET LIGHTING

6 PROJECT CLOSE-OUT DOCUMENTS

6.1 CONSTRUCTION INSPECTION BINDER

6.2 LIEN WAIVERS

6.3 RECORD DRAWINGS

6.4 EASEMENTS

7 SURVEYING STANDARDS

7.1 HORIZONTAL & VERTICAL CONTROL

7.2 CONSTRUCTION STAKING

7.3 MONUMENTS

8 APPENDICES

8.1 DOCUMENTS REQUIRED - ONLY IF APPLICABLE

8.1.1 DEVELOPMENT AGREEMENT

8.1.2 STORMWATER MAINTENANCE AGREEMENT

8.1.3 PUBLIC UTILITY EASEMENT

8.1.4 LETTER OF CREDIT

8.1.5 BIDDER'S PRE-QUALIFICATION STATEMENT

8.2 DETAILS

Figure	Detail Description
1	Typical Cross Section for a Residential Street
2	Typical Cross Section for an Urban Street
3	Typical Cross Section for a Commercial/Industrial Street
4	Typical Cul-De-Sac Detail for a Rural Street
5	Typical Cul-De-Sac Detail for an Urban Street
6	Mountable Curb & Gutter
7	Vertical Face Curb & Gutter
8	Driveway Approach Urban Section

9	Driveway Approach Rural Section
10	Side Path Cross Section
11	Interim Pavement Inlet Design
12	Final Pavement Inlet Design
13	Sampling Manhole
14	Field Inlet
15	Catch Basin
16	Street Light Installation

TABLE OF CONTENTS

1 CONSTRUCTION PLAN REQUIREMENTS	7
1.1 GENERAL SPECIFICATIONS.....	7
1.2 PLAN REVIEW	8
1.2.1 DETAIL SHEET.....	8
1.2.2 PLAN VIEW	9
1.2.3 PROFILE VIEW	9
1.2.4 SIGNAGE PLAN	9
1.3 MASTER GRADING & DRAINAGE PLANS.....	10
1.4 EROSION CONTROL PLAN	11
1.5 STORM WATER MANAGEMENT PLAN.....	13
1.5.1 GENERAL.....	13
1.5.2 PLAN VIEW	13
1.6 STORM SEWER PLANS	14
1.6.1 PLAN VIEW.....	14
1.6.2 PROFILE VIEW	15
1.7 SANITARY SEWER & WATER MAIN PLANS.....	16
1.7.1 GENERAL	16
1.7.2 PLAN VIEW.....	16
1.7.3 PROFILE VIEW	17

1.8 ROADWAY PLANS18

1.8.1 GENERAL18

1.8.2 PLAN VIEW.....18

1.8.3 PROFILE VIEW19

1.9 PRLIMINARY PLAT.....19

1.10 FINAL PLAT20

1.11 PLAN SET SUBMITTAL SCHEDULE.....20

1 CONSTRUCTION PLAN REQUIREMENTS

1.1 GENERAL SPECIFICATIONS

1.1.1 Plans submitted for approval shall be on "D" size paper, 24-inches x 36-inches. The only exception is the master grading plan. The master grading plan shall not exceed a size of 30-inches x 36-inches and shall show the entire development if possible. If additional sheets are required match lines shall be used. Plans may be submitted electronically **on a flash drive or through a file sharing program** and/or on 11-inch x 17-inch paper if approved by Director of Public Works. **If submitted electronically, the drawings shall be a .pdf file type.**

1.1.2 Plans shall be drawn to a recognized Engineering scale, i.e.: 1" = 40' or 1" = 50' horizontal and 1" = 4', 1" = 5' vertical.

1.1.3 Plans shall use local datum (NVDG **1988** datum) in establishing benchmarks and elevations.

1.1.4 Title blocks are required on each plan page and shall include:

- "Consulting Firm and Contact Information"
- "Drawn By"
- "Designed By"
- "Checked By"
- "Date"
- "Scale"
- "Revised"
- "Project Name"
- "Location of Project"
- "Type of Plan"
- "Sheet Number"

1.1.5 Stationing shall be at 100-foot intervals from South to North or West to East and shall be indicated on plan and profiles. Every 100-foot station shall be noted.

1.1.6 Each set of plans, drawings, documents, specifications, and reports shall be signed, dated, and stamped by a registered Professional Engineer in the State of Wisconsin, according to the Wisconsin Administrative Code Chapter A-E 2(4). The design Engineer shall bear the responsibility for the coordination of submitting all development plans for review. Any plans that are submitted without a professional seal will be rejected.

1.1.7 A cover sheet is required for the plan set. The cover sheet shall include a 1" = 200' scale drawing of the project area that shows the locations of the proposed improvements. Plan sheets shall be indexed on this 200 scale system plan. NAD83 and NAVD88 are to be used.

1.1.8 Each cover sheet shall show the locations, elevations, and descriptions of the project benchmarks as established by the project surveyor. The cover sheet shall also show a location map with township, range, and section labeled.

1.1.9 Profile view shall be located below the plan view on plan/profile drawings and the two views should be in alignment vertically.

1.1.10 Each plan sheet shall show a north arrow. North direction shall be to the top or to the right of the sheet and indicated by a north arrow.

1.1.11 A legend shall be included in the plan set to designate line types.

1.1.12 Four (4) sets of all preliminary plans and specifications shall be submitted for initial review and corrections. Plans and support documents (i.e. stormwater management report, maintenance agreement, etc.) requiring state approval from MMSD and DNR, shall be processed through the Village. After Village review and approval, the documents will be sent to the appropriate state agencies by the Village Engineer.

1.1.13 Two full size and two half size sets of approved complete construction plans and specifications which meet all the requirements shall be submitted to the Village at least three working days prior to the preconstruction meeting. The preconstruction meeting is to be overseen by the Director of Public Works or their designee. Failure to submit plans and specs within the required time frame will result in the cancellation of the preconstruction meeting. These construction plans shall include but not be limited to the following:

- Sanitary Sewer Plans
- Water main and Pump house Plans
- Storm Sewer/Sump Pump Collection System Plans
- Roadway Plans
- Master Grading/Drainage Plans
- Specifications
- Miscellaneous Quantities

1.2 Plan Review

1.2.1 Detail Sheet

1.2.1.1 A minimum of five (5) working days shall be required for approval of any revisions or changes to previously approved plans. The approval shall be in writing from the Village Engineer. No construction related to these proposed revisions or changes shall proceed prior to the approval of such revisions.

1.2.1.2 Preliminary proposed and existing grading plans (with plan view of preliminary sanitary sewer) shall be reviewed prior to all other preliminary construction plans being submitted. Complete detail and calculations for detention/retention objectives should be shown.

1.2.1.3 Digger's Hotline number of 1-800-242-8511 shall be noted on the plan set.

1.2.1.4 All requirements of the Village of Germantown Municipal Code, the DNR, and MMSD shall be met.

1.2.1.5 A construction estimate including materials, quantities, and cost will be included with the plans for water, sanitary, roadway, storm water, and grading.

1.2.1.6 A copy of the approved plans shall be submitted to the Village on CD in AutoCAD v2020.

1.2.2 Plan View

1.2.2.1 Lot, block, street, property, ¼ section, and easement line shall be shown.

1.2.2.2 Lot and block numbers, subdivision name, and existing physical features shall be shown.

1.2.2.3 Lot or property frontage, street width and easement dimensions shall be indicated.

1.2.2.4 Street names shall be shown.

1.2.2.5 Street centerline shall be indicated.

1.2.2.6 Match lines shall be shown to next plan sheet.

1.2.2.7 Dimensions showing offset from right-of-way and proposed roadway or easement centerline to proposed utility alignment.

1.2.3 Profile View

1.2.3.1 Elevations shall be based on the Village of Germantown datum (NAVD88) and given to the nearest 0.01 of a foot. Benchmarks used shall be indicated on the plans.

1.2.3.2 Conversion factor to Milwaukee Metropolitan Sewerage District datum shall be shown on the plans. (-580.61')

1.2.4 Signage Plan

1.2.4.1 Sign types, locations, and regulations to be listed and clearly stated.

1.3 Master Grading and Drainage Plans

1.3.1 General

1.3.1.1 Scale of the plans shall be 1" = 100' for the master plan and 1" = 40' for the individual plan sheets.

1.3.1.2 A note shall be prominently placed on each sheet of the Master Grading Plan indicating "The Village of Germantown shall not approve any grade change in excess of 0.25 feet unless authorized to do so by the Village Engineer."

1.3.2 Plan View shall show the following:

1.3.2.1 Subdivision boundary lines and all lot lines.

1.3.2.2 Adjoining and inclusive roadways and their names.

1.3.2.3 Contour lines at 2-foot intervals. These contour lines shall extend at least 100 feet into adjacent parcels. Contours shall show all offsite drainage that is tributary to the site. Existing contour lines shall be dashed while proposed contour lines shall be solid, with the 10-foot increments in boldface.

1.3.2.4 Existing and proposed culvert locations, invert elevations, sizes, and materials on and within 200 feet of the proposed development.

1.3.2.5 Existing and proposed storm sewer locations, invert elevations, sizes, and materials on and within 200 feet of the proposed development, including catch basins, manholes, inlets, and BMP's.

1.3.2.6 Location of existing trees with Diameter at Breast Height (DABH) and type.

1.3.2.7 Location of proposed topsoil stockpile.

1.3.2.8 Proposed building pad locations and finished floor elevation for each lot, which incorporate setbacks and offsets and show finished yard grade, and exposure grade, if applicable, elevations to the nearest tenth of a foot. If it is desirable to maintain post grading/pre-building construction yard grades low, to not exceed 1.5 feet, it shall be noted prominently on plan.

1.3.2.9 Proposed elevations at all property corners.

1.3.2.10 Show all high points, low points, and overland drainage paths with elevations.

1.3.2.11 Notes required to sequence the construction activities (i.e. erosion and grading notes and plans which shall be done ahead of other operations on site to manage storm water runoff).

1.3.2.12 Specific details on all retention/detention basins, ponds, overflows, outlet structures, etc.

1.3.2.13 Obstructions within the project limits including but not limited to: trees, landscaping, fences, structures, light poles, etc.

1.3.2.14 Finished street centerline elevations shall be indicated at 100-foot stations, all intersections, cul-de-sacs, and other changes in slope. At vertical curves, elevations shall be shown at P.V.C., P.O.C., P.V.T. and at 25-foot intervals for curves 100 feet long or less. For vertical curves over 100 feet long, elevations at 50-foot intervals along the V.C., plus the P.O.C. and P.V.I.

1.3.2.15 Channel or swale flow-line elevations shall be indicated every 25 feet within public land or easement.

1.3.2.16 Arrows indicating path and direction of sheet flow shall be shown for each proposed lot.

1.3.2.17 Mapped wetland boundaries and 100-year floodplain shall be delineated along with setbacks.

1.3.2.18 Overflow discharge and overland flow path.

1.3.2.19 After finished grading is accomplished, a grading record drawing shall be created and submitted to verify conformance with the approved grading plan. The drawing shall consist of the following:

- A. Use approved grading plan as the base sheet. Denote "record drawing" in bold letters at the top and specify the firm doing the record. Cross out the name of the design firm if different than the firm doing record drawings. Drawings should denote a Record Drawing (As-Built) Date.
- B. Spot elevations in the center of all lot building pads to the nearest tenth of a foot.
- C. Spot elevations at all property corners to the nearest tenth of a foot.
- D. Crossroad culvert invert elevations to the nearest hundredth of a foot.
- E. Flowline ditch elevations at every even station to the nearest tenth of a foot.
- F. Berm elevations to the nearest tenth of a foot.
- G. Spot elevations at all high and low points to the nearest tenth of a foot.
- H. Verify topo lines as directed by the Village Engineer.
- I. Field inlet grate elevations.

1.4 Erosion Control Plan

1.4.1 General

1.4.2 Plans shall conform to Chapter 17 Zoning Code, Section 17.44 Erosion Control of the Municipal Code.

1.4.3 Plans shall conform to The Wisconsin Stormwater Manual and the Wisconsin Construction Site Best Management Practice Handbook.

1.4.4 In certain instances, it is accepted to combine the grading and drainage plan with the erosion control plan, as long as all required items are discernible.

1.4.5 Plan View shall show the following:

1.4.5.1 Site boundaries and adjacent lands.

1.4.5.2 Vegetative cover and soil type.

1.4.5.3 The limits of any areas which need special stabilization techniques.

1.4.5.4 Mapped wetland boundaries, 100-year floodplain, and watercourses shall be delineated along with setbacks.

1.4.5.5 Location and dimensions of storm water drainage systems and natural drainage patterns on and immediately adjacent to the site for 200 feet.

1.4.5.6 Locations and dimensions of existing; utilities, structures, roads, highways, paving, lot lines and outlots.

1.4.6 Proposed conditions of the site shall include:

1.4.6.1 Locations and dimensions of all proposed land disturbing activities, including finished topography.

1.4.6.2 Location and dimensions of all temporary soil and dirt stockpiles with erosion control method.

1.4.6.3 Location and dimensions of all construction site sediment and erosion control measures necessary. From the WI Construction Site Handbook, best management practices include the following categories: diverting flow, managing overland flow, trapping sediment in channelized

flow, establishing permanent drainageways, protecting inlet trapping sediment during site dewatering, preventing tracking, and others. Construction details should be shown on the plan.

1.4.6.4 Location, dimensions and description of all channels, pipes, structures, basins or reservoirs, or other conveyances proposed to carry runoff to the nearest adequate outlet, including applicable design assumptions and computations. The application, design discharge rate, in cubic feet per second, for each structure, pipe, channel, or conveyance. Design flow velocity for channels and outlets shall be indicated.

1.4.6.5 Areas to be sodded or seeded and mulched or otherwise, stabilized with vegetation, describing type of final vegetative cover. Type and quality of mulch and method of anchoring shall be indicated, as well as seeding mixtures, rates, lime and fertilizer application rate for temporary or permanent seeding.

1.4.6.6 Schedule of anticipated starting and completion date of each land disturbing and land developing activity including the installation of construction site control measures.

1.4.6.7 Provisions for maintenance of the construction site control measures during construction.

1.4.6.8 Completion of weekly DNR form for maintenance of erosion control as required in permit.

1.5 Storm Water Management Plan

1.5.1 General

1.5.1.1 MMSD Rules and Regulations Chapter 13, shall be followed for developments that involve an increase of one-half acre or more of impervious surface.

1.5.1.2 DNR Chapters NR 151 and NR 216 shall be followed for construction sites with 1 acre or more of land disturbance.

1.5.1.3 The Village's Storm Water Management Guidelines shall be followed for developments with > 3,000 SF of land disturbance.

1.5.2 Plan View

1.5.2.1 Highlight drainage basins and specify acres of each basin for existing and proposed conditions. Show contours to determine accuracy of constructed basin.

1.5.2.2 Show time of concentration paths including lengths and slopes.

1.5.2.3 Indicate soil groups and curve numbers.

1.5.2.4 Show detention basin volumes, high water level (HWL), overflow location and elevation. Indicate basins with a title to be referenced by details and in the report.

1.5.2.5 Provide detail of basin discharge structure, size, and materials, showing the 2-yr and 100-yr elevations and restrictions.

1.5.2.6 Existing and proposed contours in pond area at one-foot contour interval.

1.5.2.7 Flood routing for runoff greater than design capacity.

1.5.2.8 Flood stage elevation of 100-year 24 hour storm event.

1.5.2.9 Accompanying the plan shall be a signed and sealed Detailed Storm Water Management Report including a narrative, design assumptions, conclusions, calculations, and recommendations.

1.6 Storm Sewer Plans

Plan View

Right-of-way and its width.

Lot lines, lot and block numbers, frontages, and house addresses.

Name of each roadway and any intersecting roadways in which the storm sewer will be located.

Edge of pavement or face and back of curb and sidewalk.

All easement limits and widths, including existing and proposed, permanent and temporary.

All proposed and existing sanitary sewer and laterals (existing-dashed, proposed-solid).

All proposed and existing water main and laterals (existing-dashed, proposed-solid).

Proposed size and diameter of manholes, catch basins, inlets, and junction boxes.

Inlets at intersections shall be located at the end of the curb and gutter radius and not in pedestrian walkways.

Dimensions showing offset from right-of-way and roadway centerline to the storm sewer. Typically, the storm sewer should be located 10 feet south or west of roadway centerline.

Length and diameter of storm sewer between structures, from center to center of manholes, and other structures shall be dimensioned.

Material and size of any existing storm sewer to be tied into.

Details of outfall or ditch inlet protection requirements such as riprap, end sections or headwalls as needed.

Additional details shall include typical manholes, catch basins, inlets, etc.

Location of sump pump collection system, field drains, and drainage tiles, as well as construction elevations and details.

All obstructions/appurtenances located within the project limits, including, but not limited to: trees, signs, utilities, fences, light poles, structures, etc.

A note shall be included that states storm sewer construction shall be according to the latest addition of the Standard Specifications for Sewer and Water construction in Wisconsin and Village of Germantown Construction Standards and Specifications. Germantown's municipal code and standard specifications supersede other standard specifications, when there are conflicting requirements.

Profile view

Existing and proposed surface profiles over the storm sewer.

The proposed size, material, and diameter of manholes, catch basins, inlets, culverts, and junction boxes.

Distances, slope, size, and material of storm sewer shall be labeled between structures center to center.

Rim and invert elevations at structures.

Invert of storm sewer pipe if different than structure invert elevation.

Material and size of any existing storm sewer to be tied into.

Sanitary sewer (dashed).

Water main (dashed).

Backfill material to be used shall be labeled and compacted according to designated methods as approved by the Village Engineer.

1.7 Sanitary Sewer and Water Main Plans

1.7.1 General

1.7.1.1 Sanitary sewer and water main may be shown on the same sheet as approved by Village Engineer.

1.7.1.2 Plans shall state that construction shall be according to Standard Specifications for Sewer and Water Construction in Wisconsin, and the Construction Standards and Specifications of the Village of Germantown.

1.7.2 Plan View

1.7.2.1 Right-of-way and its width.

1.7.2.2 Lot lines, lot and block numbers, frontages, and addresses.

1.7.2.3 Edge of pavement or face and back of curb and sidewalk where applicable.

1.7.2.4 All easement limits and widths; easements shall be a minimum of 20 feet wide.

1.7.2.5 Proposed water main pipe material, diameter, hydrant, valve and lateral locations. (existing-dashed, proposed-solid).

1.7.2.6 Existing water facilities on, or adjacent to, the development. This shall include material and size of any existing water main.

1.7.2.7 Proposed sanitary sewer manholes, pipe slopes and center-to-center distances between manholes, pipe diameter, laterals, and rim and invert elevations. (existing-dashed, proposed-solid).

1.7.2.8 Existing sanitary facilities on, or adjacent to, the development. This shall include material and size of any existing sewer.

1.7.2.9 Sanitary sewers shall generally be located at the centerline of the street. Water mains shall be located 10 feet to the north or east of centerline of the street and shall maintain all necessary clearances as defined by standard specifications.

1.7.2.10 Dimensions showing offset from right-of-way to the sewer line and water line. Dimensions shall also show the separation between the sanitary sewer, water main, and other utilities.

1.7.2.11 Length of each sanitary sewer lateral and length of any lateral risers, as measured from the centerline of the mainline.

1.7.2.12 Elevations of sewer and water shall refer to flowline or invert of pipe.

1.7.2.13 Name of each roadway and any intersecting roadways in which the sanitary sewer will be located.

1.7.2.14 All manholes, valves, and hydrants should be labeled.

1.7.2.15 Proposed or existing storm sewer and appurtenances (existing-dashed, proposed-solid).

1.7.2.16 All improvements are to use roadway stationing.

1.7.2.17 All obstructions/appurtenances located within the project limits including but not limited to trees, signs, utilities, fences, light poles, structures, etc.

1.7.3 Profile View

1.7.3.1 Existing and proposed surface profiles over the sanitary sewer and water main.

1.7.3.2 The proposed label, diameter, rim and invert elevations of sanitary sewer manholes (inches) for existing and proposed.

1.7.3.3 Invert of sanitary sewer pipe if different than structure invert elevation.

1.7.3.4 Pipe material, slope and diameter of sanitary sewer between each manhole as plus or minus foot per foot.

1.7.3.5 Center-to-center distance between manholes.

1.7.3.6 The proposed water main pipe material and its diameter.

1.7.3.7 Center of hydrant nozzle, and hydrant shoe elevations shall be indicated.

1.7.3.8 Limits of gravel, spoil, and/or slurry backfill.

1.7.3.9 Proposed or existing storm sewer and appurtenances (existing-dashed, proposed-solid).

1.7.3.10 Crossings with existing or proposed underground improvements shall be drawn with the name, diameter, elevation and station indicated.

1.7.3.11 Material and size of any existing sanitary sewer and water main to be tied into.

1.7.3.12 Stationing shall be done for all appurtenances.

1.7.3.13 Areas of concrete cradle and envelope shall be dimensioned and labeled.

1.8 Roadway Plans

1.8.1 General

1.8.1.1 Both typical sections and cross-sections shall be shown on the Plan and Detail sheets. Cross-sections details shall also be shown for a cul-de-sacs and t-turnarounds.

1.8.1.2 Elevations shall refer to finished centerline grade.

1.8.1.3 Plans shall state that paving construction shall be according to WIS DOT Standard Specifications for Road and Bridge Construction, latest edition. Germantown's municipal code and specifications supersede if there is any conflict.

1.8.2 Plan View

1.8.2.1 Right-of-way and its width.

1.8.2.2 Edge of pavement face and back of curb and sidewalk.

1.8.2.3 Stationing along the centerline of the roadway, including cul-de-sacs and t-turnarounds.

1.8.2.4 Stations shall be indicated by tick marks along the centerline and every 100-foot station shall be labeled.

1.8.2.5 Width of pavement flange to flange.

1.8.2.6 Lot lines, numbers, frontage lengths, and house addresses.

1.8.2.7 Name of each roadway and any adjoining roadways.

1.8.2.8 Curb radii shall be dimensioned to the back of curb. Curb radii are to be verified and approved by the Village Engineer.

1.8.2.9 Flange lines and back-of-curb lines shall be drawn.

1.8.2.10 Flange elevations shall be shown at the beginning, end, and change of slope, at all curb and gutter sections, cul-de-sacs, and warped pavement sections. Length of curve and slope shall also be shown.

1.8.2.11 Specific details of all existing roadways being connected to. Pavement, shoulders, ditches, curb alignment and grades shall be shown as needed to adequately make the transition to match existing grades.

1.8.2.12 All driveways within 500 feet of the proposed development.

1.8.2.13 All roadside ditch locations, flow line elevations at 100-foot intervals, and slope of the ditch.

1.8.2.14 All obstructions/appurtenances located within the project limits including but not limited to: trees, signs, utilities, fences, light poles, structures, etc.

1.8.3 Profile View

1.8.3.1 Existing and proposed roadway profiles along centerline of roadway, cul-de-sacs, and t-turnarounds.

1.8.3.2 Stationing and final centerline grades at all fifty- and hundred-foot stations and at all grade breaks.

1.8.3.3 Proposed grades and stationing shall be shown at each station, at intersections, at street lines extended and at 25-foot intervals, P.C., P.T., and P.I., of vertical and horizontal curves.

1.8.3.4 Slopes shall be indicated as plus or minus foot per foot.

1.9 Preliminary Plat

1.9.1 Two (2) copies of a preliminary plat shall be submitted with the other required preliminary plans for initial review.

1.9.2 Three (3) copies of an approved, recorded preliminary plat conforming to Section 236.11 (1)(a) of the Wisconsin Statutes shall be required at least one month prior to the start of any construction.

1.10 Final Plat

1.10.1 The final plat will not be certified by the Village until conditions of the development agreement are met.

1.10.2 One (1) full size 24" x 36" and one (1) 8½"x11" 200 scale copy of the final plat conforming to Section 236.25 (2)(c) and (d) of the Wisconsin Statutes shall be submitted to the Village within 10 days of recording. A digital file compatible with AutoCAD in .DWG format shall also be submitted.

1.10.3 The AutoCAD digital plat will be mapped using the Wisconsin State Plane Coordinate System – South Zone and based on the NAD83. All construction plans and record documents will be based on this same survey requirement. The coordinates of all section and quarter section monuments are available from the Village Engineering Department.

1.11 Plan Set Submittal Schedule

1.11.1 Village of Germantown Submittals

1.11.1.1 When submitting plans to the Village for: sanitary sewer, water main, storm sewer, paving, grading, and erosion control, provide the following number of plan sets:

A. For the FIRST submittal, the plans shall go through the Village Planner and receive Village board approval. Their requirements shall be followed. Please provide four (4) copies of the plans in digital form and 24-inch x 36-inch plan sets.

B. For each SUBSEQUENT submittal after approval by Village Board, two (2) copies of each plan set.

C. For the FINAL submittal, two (2) copies of each plan set.

1.11.1.2 The Village shall be copied on all correspondence to and from governing agencies including MMSD, DNR, Army Corps of Engineers (COE).

1.11.2 Sanitary Sewer Plan Submittal to MMSD/DNR

1.11.2.1 Sanitary Sewer submittals shall follow the requirements of NR 110 and all other chapters, along with MMSD Chapter 2. Projects eligible for DNR 'Fast-Track' – as designated on DNR's website. This information is located on Form 3400-160.

1.11.3 Any additional data or documents required by MMSD or DNR shall be furnished by the consulting Engineer.

1.11.4 Water main Plan Submittal to DNR

1.11.4.1 Water Main Extensions shall follow the requirements of NR 811 and all other applicable chapters.

- A. One copy of the cover letter/Village approval letter.
- B. One set of plans and specifications.
- C. Form 3400-105 Acknowledgement of Receipt by DNR
- D. Form 3300-66 Water Main Submittal Checklist

1.11.5 Any additional data or documents required by MMSD or DNR shall be furnished by the consulting Engineer.

1.11.6 Storm Sewer Submittal to MMSD

1.11.6.1 Storm Sewer shall follow the requirements of Chapter 2.

- A. One copy of the cover letter/Village approval letter.
- B. One copy of the plans and specifications.
- C. One copy of the relevant system plan
- D. One copy of the design computations.

1.11.7 Storm Water Management Plan Submittal to MMSD/DNR

1.11.7.1 An electronic copy of the Storm Water Management Plan shall be submitted to MMSD via Sharepoint and shall follow the requirements of Chapter 13 and the Surface Water and Storm Water Rules.

1.11.7.2 Construction activities that disturb more than 1 acre of land shall apply for an NOI and an NOT from the DNR and shall follow the requirements of NR 216 and NR 151.

1.11.7.3 Chapter 30 permits and Water Quality permits shall be obtained as required. ACOE permits for work in wetlands shall also be obtained.

TABLE OF CONTENTS

2 WATER SYSTEM	23
2.1 SPECIFICATIONS	23
2.1.1 WATER MAIN PIPE	23
2.1.2 WATER SERVICES	24
2.1.3 TRENCH CHECK DAM	26
2.1.4 VALVES	26
2.1.5 VALVES BOXES	27
2.1.6 VALVE VAULTS	28
2.1.7 HYDRANTS	30
2.1.8 FITTINGS	32
2.1.9 WATER METERING REQUIREMENTS	33
2.1.10 POLYETHYLENE WRAP	34
2.1.11 TRACER WIRE	34
2.1.12 TAPPING	36
2.1.13 BEDDING/COVER/BACKFILL	37
2.1.14 CAPS & PLUGS	38
2.1.15 CASING/CARRIER PIPE	39
2.2 ABANDONMENT	39
2.2.1 GENERAL	39
2.2.2 WATER SERVICES	40
2.3 INSPECTION	40
2.3.1 SUBMITTALS AND SAMPLES	40
2.3.2 DISINFECTING	41
2.3.3 ACCEPTANCE TESTING	41
2.4 OTHER REQUIREMENTS	43

2 WATER SYSTEM

All labor and material shall be governed by requirements of the latest edition and all amendments thereto of the Standard Specifications for Sewer and Water Construction in Wisconsin (SWS), Public Service Commission (PSC) Rules and Wisconsin Department of Natural Resources (WDNR) Regulations, unless otherwise specified in these Specifications, whichever is more restrictive.

2.1 SPECIFICATIONS

2 WATER MAIN PIPE

1. MATERIALS

- a. All pipe used for water main shall comply with SWS and the following:
 - i. 6" PVC – Hydrant leads
 - ii. 8" PVC or Fusible PVC C-900 and/or C90/RJIB Certa-Lok
 - iii. 12" PVC or Fusible PVC C-900 and/or C90/RJIB Certa-Lok
 - iv. 16" PVC or Fusible PVC C-900 and/or C90/RJIB Certa-Lok
 - v. Sizing of private mains requires approval by the Village Engineer.
- b. PVC or PVCO water main for sizes 4" through 16" diameter, excepting service laterals shall conform to the outer diameter (OD) of Ductile Iron pipe and be AWWA C-900 or AWWA C-909, Class 150 or 200, DR-18 or -14. Shall conform to Standard Specifications Ch. 4.6.0 and 8.20.0. All pipe shall be furnished with Push-On type integral elastomeric bell-spigot joints. USA manufactured products only.
- c. Fire and Combination Fire/Water service lines from the connection at the main to the backflow prevention device connection, shall be:
 - i. PVC/PVCO for sizes 3" through 12" diameters only, conforming to the OD of Ductile Iron pipe, AWWA C-900 or AWWA C-909, Class 200, DR-14
 - ii. All pipe shall be furnished with Push-On type integral elastomeric bell-spigot joints.

2. DESIGN STANDARDS

- a. Main sizes (Minimum).
 - i. Residential: 8" minimum
 - ii. Multifamily and commercial: 12" subject to Village Engineer approval.
 - iii. Industrial: 12" subject to Village Engineer approval.

- b. Watermain Location
 - i. In streets & easements: 10 feet from sanitary sewer; north and east.
- c. Watermain Bury Depth/Pipe Design Cover
 - i. Turf – 6.5 feet (below final grade);
 - ii. Paved Areas - 7 feet minimum
 - iii. Special situations (i.e.: ditches, etc.)- 5 feet minimum cover with insulation.
 - iv. Under 4 feet of cover water main shall be offset to achieve 6 foot cover.
- d. Tracer wire installation is required on all water mains, branches, and services.

ii. WATER SERVICES

1. MATERIALS

- a. Sizes thru 2" diameter shall be of one manufacturer only, as follows:
 - i. Service Lines
 - 1. PVC
 - 2. Crosslinked polyethylene PEXa
 - 3. 250 psi pressure rated, SDR-9,
 - 4. copper tube size, ASTM D-2737, NSF 14, AWWA C-901
 - 5. with tracer wire run to the building, terminate in same type and manor as hydrant detail
 - 6. There shall be no joints between the corporation valve and curb stop and no joint between the curb stop and meter horn valve.
 - 7. Laying length of PVC lines shall afford enough slack to allow for thermal contraction of the plastic and in such manner as to avoid placing it under any undue tension.
 - vii. All curb stop boxes shall be wrapped with polyethylene.
 - ii. Fittings
 - 1. Terminal couplings on PVC services shall be made with a pressure tight joint with a Buna-N beveled gasket, and stainless-steel insert sleeve equal to Ford 50-series, and compression fitting which includes a grooved clamp equal to:
 - a. USA manufactured products only.
 - iii. Valves
 - 1. Corporation (Ball) Valves: Mueller B-25008N; Ford FB1000-Q-NL; A.Y. McDonald 74701BQ.
 - 2. Curb (Ball) Valves: Mueller B-25155N; Ford B44-Q-NL; A.Y. McDonald 76104T.
 - 3. Curb Boxes: (Minn. Pattern) Mueller H-10300 and H-10302; Ford E.M. 2-65-56/57 and 2-70-56/57; A.Y. McDonald 5614/15.
- b. Sizes 3" diameter and larger shall be as follows for Service Lines, Valves, and Fittings:
 - i. Connection to Main: Anchoring tee with service line valve anchored to the main branch tee or tapping sleeve and reducing fitting, when appropriate.
 - ii. Lines: Per "Water Main – Materials" section.

- iii. (Curb) Valves: Per "Valves – Materials" section.
- iv. Valve Boxes: Per "Valve Boxes – Materials" section.
- v. Fittings: Per "Fittings – Materials" section.

- c. All stop boxes and service valves shall be exposed, plumb, clean, and operable, when initially installed during new construction, as well as during rehabilitation or repaving projects.

2. DESIGN STANDARDS

- a. Location, as you face the property, shall be to the left of the sanitary sewer lateral. Each habitable building shall have its own unshared service connection to the main.
- b. On new construction, curb stop shall not be located within 5 feet of the driveway.
- c. Water services shall have a trench check dam installed on the property side of the curb stop. See Specification 2.1.3 and Detail Figure 20.
- d. Pipe design cover:
 - i. Turf (Ultimate grade) - 6 feet minimum
 - ii. Paved areas - 7 feet minimum
 - iii. Special Situation (i.e.: ditches, etc.) - 5 feet minimum cover with insulation
 - iv. Under 4 feet of cover water main shall be offset to achieve 6-foot cover.
- e. Following sizes are minimums, larger sizes may be required based upon fixture units and point of service pressure:

Type	Distance (building to main)	No. Of Units		Size
Single Family	<55'			1 ¼" ID
	>55'			1 ½" ID
Two Family	<55'			1 ½" ID
	>55'			2" ID
Multi-Family		<=4		2" ID
		<=8		4" ID
		<=12		4" ID
		<=24		6" ID
		<=48		8" ID
Commercial				2" ID
Industrial				2" ID

- f. Laterals 2" diameter and smaller may be installed in common trench with the sanitary sewer; Place the shut off at the (future) ROW or easement line.

- g. Laterals greater than 2" diameter shall be installed a minimum of 8.0 feet away from sanitary or storm laterals; place the shut off at the water main connection tee.
- h. Generally, PVC service lines shall be installed in accordance with SWS Chapters 5.1.0, 5.2.0 and 5.5.0, and File Nos. 50 & 51, and the following requirements:
 - i. PVC service pipe 1½" diameter and smaller shall be installed with NO coupling or joint from the corporation stop to the curb stop valves, and the run from the curb stop valve to the meter horn.
 - ii. PVC service pipe 1½" and 2" diameter shall be installed with NO coupling or joint from the corporation stop to the curb stop valve, and the run from the curb stop to the meter horn. In the event of a run greater than 55 ft., then the shortest pipe length shall be 20 ft.
- i. Existing laterals not used in a development shall be abandoned at the main when a development, land division or building razing occurs. See Section 2.2 regarding Abandonment.
- j. When an existing water service is stubbed to a parcel and is deemed not functional, it will be abandoned, per Section 2.2, and a new service line shall be installed.
- k. When laterals greater than 2" diameter is existing and the new construction connects to lateral, it will be at the discretion of the Village to allow the connection or abandon at the main and reinstall a new lateral paid for by the property owner. See section 2.2.1.1

iii. TRENCH CHECK DAM

1. MATERIALS

- a. Clay material shall have no organic material and shall be compacted to 95 percent standard proctor. Or;
- b. Pre-approved equals such as: AquaBlok®, slurry and others.

2. DESIGN STANDARDS

- a. Trench check dam shall be installed on all water services
- b. For water main pipe, if groundwater is present, a trench check dam shall be installed on all Water Main Pipe or as directed by the Village Engineer.
- c. The check dam shall be located on the property side of the curb stop.
- d. Install check dam with bentonite chips 2 feet thick across the full width of the trench and 4 feet above pipe crown.

~~e. See Detail Figure No. 20.~~

iv. VALVES

1. MATERIALS

All valves shall be Resilient type; acceptable valves are:

- a. Butterfly Valves - for 16" and larger diameters, conforming to AWWA C504-94, stems sealed by at least two O-Rings, and worm gear operators for 2" square valve key operation from above, turn left (CCW) to open. Install with operating nut on North or East side of water main. Acceptable valves include:
 - i. M & H 4500
 - ii. Kennedy
 - iii. Pratt Groundhog
 - iv. Mueller LineSeal III-3211-20 or XP-5227-20, or
 - v. Pre-approved equal.
- b. RW Gate Valves - for 12" and smaller diameters, conforming to AWWA C-509-94, 250 psi rated, non-rising stems sealed with two O-Rings, MJ ends (or MJ-F), turn left (CCW) to open, 2" square operating nut. Acceptable valves include:
 - i. ~~Clew R/W~~
 - ii. Kennedy R/W – 4571
 - iii. Mueller R/W A-2361 or 2362
 - iv. Pre-approved equal.
- c. All exposed and non-epoxy coated bolts and nuts on hydrants and valves shall be stainless steel; T-Bolts shall be Cor-Blue or have a fluoropolymer coating as pre-approved by the Village Engineer.
- d. All valves shall be furnished with interior and exterior epoxy coatings per AWWA C-550-90. All valves not installed in vaults or manholes shall be installed per SWS File No. 37, and shall be wrapped with polyethylene per Section 2.1.10 of these Specifications.

2. DESIGN STANDARDS

- a. Valve locations.
 - i. On all legs of branch lines: Mega-lugged to watermain
- b. Maximum spacing between valves:
 - i. At each intersection.
 - ii. Every 800 feet.
 - iii. Not greater than 24 residential equivalent units. (i.e.: 24 SF units; 3 – 8 Family Units).

v. VALVES BOXES

1. MATERIALS

- a. Valve boxes shall be cast iron, manufactured in the USA, and shall properly accommodate the selected valves. Acceptable manufacturers are:

- i. Tyler Series 6860 US Domestic
- ii. Pre-approved equal.

b. Valve & enclosure type.

Size	Box	Type	Manhole Vault
4"	YES	RW-GV	
6"	YES	RW-GV	
8"	YES	RW-GV	(Special Circumstances)
12"	YES	RW-GV	(Special Circumstances)
16"	YES**	RW-BV	(6 Foot Diameter Option**)

- c. A valve box #6 base adaptor by Adapter, Inc., or pre-approved equal, shall be furnished as part of the complete valve box for direct-bury gate & butterfly valves.
- d. Top sections of valve boxes shall be whole factory lengths. Breaking of the top section to shorten its length is not acceptable.
- e. Screw-in risers are acceptable and preferred. Slip in risers may be used with prior approval.
- f. Valve box cover shall be a 5-1/4" "MWW" drop in lid with the word "Water" stamped on the top surface.
- g. All valve boxes shall be wrapped with polyethylene per Section 2.1.10 of these Specifications.
- h. All valve boxes shall be installed straight and plumb when initially installed during new construction, as well as during rehabilitation or repaving projects. The top of the valve box shall be set flush with pavement grade to avoid damage from snowplows and streets cleaning equipment.
- i. Valve boxes shall be operable, cleaned and free of debris after installation, after rehabilitation or repaving projects or after any work done by non-Utilities and Streets Department personnel.
- j. Adjustment to road boxes can be made using slip type, screw insert type and/or slip rings to accommodate a 5 1/4" lid. Smaller than 5 1/4" will not be allowed. **The contractor will make Final alignment to the valve box after binder and before the final lift of asphalt.**

vi. VALVE VAULTS

1. MATERIALS

- a. When designated on the plans or required by the Village Engineer, valve vaults/manholes shall be installed in accordance with this Section.

- b. All manholes shall be pre-cast concrete with integral base and reinforced concrete flat slab top or approved equal.
- c. All pre-cast manhole barrel joints shall be made with preformed butyl rubber gasket material (ie. 'Easy Stik' or equal).
- d. All manhole steps shall comply with SWS, Section 8.40.1.A or B.
- e. All pre-cast manhole barrel sections shall be rotated to align all manhole steps vertically in the manhole.
- f. All manhole lids shall be equal to Neenah R-1900-D with gasketed lid.
- g. All frame/casting adjusting rings shall be reinforced concrete rings having 36" I.D. The minimum height for a chimney section shall be the height associated with the proper placement of one 2" adjusting ring. The maximum height of adjusting rings above the cone as measured from the slab top is 16". If more than 16" of adjusting rings are needed to set the casting to finished grade, then an additional barrel section shall be installed on the manhole. Paving rings which have an adjustable diameter is not allowed.
- h. All chimney joints, including the frame-chimney joint, and all barrel & cone section lifting holes shall be sealed with a premixed, non-metallic, high-strength, non-shrink cementitious grout such as Pennegrout by IPA Systems, or approved equal, which meets requirements of ASTM C-1-91 and C-827 as well as CRD C-588 and C-621.
- i. Waterproofing mastic shall be placed over all lift holes and exterior of manhole chimneys that are approved to remain raised above existing grade. Trowelable grade mastic, Tremco 60 or approved equal, shall be applied to a minimum 50 mil WFT.
- j. An external sealing wrap shall be placed at all joints between pre-cast manhole sections. The external sealing wrap shall meet, or exceed, the requirements of ASTM C-877, Type II. External joint seals shall be MacWrap, as manufactured by Mar-Mac Manufacturing Co. Inc. or pre-approved equal.
- k. Coal-tar epoxy coating (two coats @ 8.0 mils DFT each) shall be applied to the exterior of ALL manholes in accordance with SWS 8.7.0. Alternate waterproofing materials and application may be pre-approved by the Village Engineer.
- l. Pipe-Manhole Connection device shall be Kor-N-Seal boot with stainless steel Snap-In banding rings or pre-approved equal.

2. Sample Station

- a. Eclipses #88SS SMPL STN 7'-0" Extreme Cold
- b. Installed with its own water curb stop and curb box
- c. Reference detail 21.

vii. HYDRANTS

1. MATERIALS

- a. Acceptable Manufacturers are:
 - i. ~~Clow Medallion UL/FM~~
 - ii. Kennedy Guardian K-81 UL/FM
 - iii. ~~Mueller A-403 Super Centurion~~
 - iv. ~~Mueller Super Centurion UL/FM~~

- v. ~~U.S. Pipe-Sentinel-250~~
 - vi. Pre-approved equal.
- b. All hydrants shall be provided as follows:
- i. MJ connection
 - ii. Turn left to open
 - iii. depth of bury 6.5'
 - iv. Painted Brite Hydrant Red (5 mil DFT)
 - v. Break flange (traffic) type
 - vi. 5.25" main valve opening
 - vii. Two 2.5" hose nozzles
 - viii. One 4.5" pumper nozzle
 - ix. One 4' long fiberglass, red reflective tape and white reflective tape with spring hydrant marker. Part #35000W (R&W)-10501
- c. If during installation and construction the village deems the coating has been compromised. It will be sand blasted and repainted per section 2.1.7.1.8 at the contractor's expense.
- d. Hydrant leads shall be six (6) inch, C900.
- e. Tapping saddle will be an all stainless-steel Smith Blair 663 with a stainless steel **Hymax H-304** MJ outlet or Romac SST-MJ stainless steel MJ outlet or equal use core-10 blue bolts. Poly wrap fitting, valves. With Valve box-Tyler only - #6860/MWW lid, Adaptor Inc. #6 base adaptor.
- f. All fasteners will be stainless steel on all valves and hydrants and on all MJ fittings will be, Cor-Blue T-bolts Birmingham Fastener or equal.
- g. Contractor shall provide for a 6.5' burial depth for all hydrant leads shown on plans. If a water main burial depth is greater than 6.5', Contractor shall install fitting(s) to raise the hydrant lead to meet the required burial depth.
- h. Hydrants that are not placed in service shall have a "Not in Service" tag attached to the pumper nozzle and baggy wrapped and tapped.
- i. Preparation for painting – Sandblast to 100% clean white metal from ground level up to top of hydrant. Dispose of spent materials. Fully enclose hydrant during blasting, priming, and painting. Air dryer shall be used to prevent moisture in the air supply.
- j. Primer-Devoe 224 high build epoxy primer (or Engineer-approved equal) to a thickness of 4-8 mils (1 mil = 25.4 millimeters).
- k. Topcoat – Devoe 379UVA urethane epoxy (or Engineer-approved equal) with a minimum thickness of 4 mils. All hydrants shall be fully enclosed during blasting, priming, and painting.

2. DESIGN STANDARDS

- a. Location:
- i. Maximum spacing: 400-ft. diameter from center of hydrant to center of hydrant. If different spacing is required, verify differing condition with Village Engineer and Fire Chief.
 - ii. At all high points in distribution system.

- iii. At intersections, far end of cul-de-sac at lot line extended, and mid-block at lot line extended, where practical. In the event a hydrant location conflicts with a valve location at an intersection, the hydrant tee shall be located 6 feet away from the main valve.
 - iv. Rural: 3 feet off Right-of-Way. Provide 5-ft. deep x 10-ft. wide hydrant easement.
 - v. Urban: 4 feet behind back of curb line.
 - vi. Side paths, recreation trails and other pedestrian ways: Minimum separation distance from edge of pathway to closest physical feature of the hydrant shall be 18".
- b. Design height: Pumper nozzle above surrounding finish ground = 18" to 24".
- c. Design cover: 6.5 feet minimum bury.
- d. Branch pipe design cover:
 - i. Turf – 6.5 feet (Ultimate grade);
 - ii. Paved Areas - 7 feet minimum
 - iii. Special situations (i.e.: ditches, etc.)- 5 feet minimum cover with insulation.
 - iv. Under 4 feet of cover water main shall be offset to achieve 6-foot cover.
- e. Break flange shall be at grade or not greater than 6 inches above grade.
- f. Branch tee shall be Anchor T with gate valve at the tee.
- g. An asphalt service drive with culvert shall be installed in all ditch crossings greater than 2.0 feet deep or that have traverse slopes greater than 4H:1V.
 - i. The service drive shall be 10 feet wide and extend to 2 feet behind the hydrant. The drive shall be constructed with 10 feet wide by 6" deep of No.2 open graded base course and 10 feet wide by 3" depth of asphalt.
 - ii. Culverts shall be hydraulically sized for each location consistent with Section 4 of the Development Handbook.

viii. FITTINGS

1. MATERIALS

- a. All pipe fittings used for water main shall comply with SWS and be manufactured in the USA.
- b. All fittings shall be Ductile Iron and be Class 350 or greater, conforming to the current ANSI/AWWA C-153/A21.53.
- c. Fittings shall have a cement mortar lining on the interior in accordance with current (USA Domestic Only) ANSI/AWWA C-104/A21.4.
- d. Fittings and accessories shall be furnished with mechanical-type joints with lugged retainer glands in accordance with current (USA Domestic Only) ANSI/AWWA C111/A21.11.
- e. All nuts and bolts shall be stainless steel on hydrants and valves. All T-Bolts shall be Cor-Blue.
- f. All tees and fittings shall be anchored with restraints or pre-approved equal.
- g. Angle Fittings shall be as follows:
 - i. All 90° bends: Full body, long radius, anchored, and mega-lugged or buttressed.
 - ii. Other Angle Fittings: Short body acceptable; anchored and buttressed.

h. Acceptable Manufacturers of Ductile Iron pipe fittings include the following:

- i. American Cast Iron Pipe Co.
 - ii. ~~Clow Water Systems, Co.~~
 - iii. Tyler Union
 - iv. Water Main Couplers
 - v. Hymax 4"-16"
 - vi. Romac 4"-12"
 - vii. Or approved equal
- i. Acceptable restraints include the following:
- i. EBAA Mega-lug
 - ii. Romac Roma Grip
 - iii. Stainless steel rodding with stainless steel star bolts
 - iv. Or approved equal

2. DESIGN STANDARDS

- a. All fittings shall be wrapped with polyethylene per Section 2.1.10 of these Specifications.

ix. WATER METERING REQUIREMENTS

1. DESIGN STANDARDS

- a. Refer to Village of Germantown Code Chapter 13.37 for general requirements.
- b. Two-Family units shall require a split service lateral into the building in accordance with Standard Detail Figure No. 19.
- c. Multi-Family Condominium buildings (4 livable units and over): A water metering room shall be required at the water service entrance location. Each water meter room shall be designed to meet the requirements of the Germantown Water Utility, including an outside doorway. An entry key shall be provided to the Germantown Water Utility. An individual meter required for each unit.
- d. Multi-Tenant Commercial and Industrial buildings: A water metering room shall be required at the water service entrance location. Each meter room shall be designed to meet the requirements of the Germantown Water Utility, including an outside doorway. All commercial and industrial buildings shall have ball valves installed on the inlet, outlet, and bypass for water meters. An entry key shall be provided to the Germantown Water Utility. An individual meter required for each unit.
- e. The water meter room shall:
 - i. Be large enough to allow work on the water meters. The size of the meter room would vary depending on the meter size(s) and number of meters going into the building. The Utility Department shall approve the size of the meter room.
 - ii. Be unobstructed by water softeners, vacuum cleaners, garbage cans, electric service, phone services, etc.
 - iii. Not be used for cleaning supply storage or storage area.
 - iv. Have adequate heating and lighting

- v. Have a floor drain
- vi. The size of the water meter shall be on the plan to make sure the room is big enough to house the entire meter.
- vii. Not installed in a ceiling
- viii. Minimum 2'-3' off the floor
- ix. If meter is installed in a cabinet, minimum 2'x2' removable opening.
- f. At the meter setting:
 - i. 1"-2" valves will be all brass USA made only, full port ball valves and brass nipples, 600psi rated Nibco T-585-70 or equal.
 - ii. A by-pass will be installed on meters 1 1/2" and larger.
 - iii. Bypass pipe to match the diameter of the through pipe.
 - iv. Bypass pipe to have its own separate shut off valve.
 - v. See detail figure #? For bypass detail (is this something we can get done in-house or do you want me to sub this out?)
 - vi. We need to include all the spec sheets by pdf or a hyper link for each meter size.
- g. All gate valves used for branch piping at the meter setting inlet, outlet, and bypass piping 3" and greater will be AWWA resilient wedge epoxy coated C509, NRS (non-rising stem). MJ connection and flanged face at the meter, all stainless-steel bolts and washers-install anti-corrosive agent on threads.
- h. Irrigation and/or Sprinkler Meter:
 - i. A sprinkler or deduct meter is required.
 - ii. A sprinkler meter is installed in parallel to the main meter (New construction).
 - iii. A deduct meter is installed after the main meter (Existing).
 - iv. Shall be connected prior to the main water meter of the residence or building.
 - v. Shall not be connected after the main meter under any circumstances.

x. POLYETHYLENE WRAP

1. MATERIALS

- a. Polyethylene film materials shall comply with SWS, Chapter 8.21.0.
- b. Wrap all ductile iron pipe, valves, fittings and valve boxes with polyethylene film.
When wrapping valve boxes, only wrap the bell portion and the bottom of the first section.

xi. TRACER WIRE

1. MATERIALS

- a. Open cut-Tracer wire will be Copperhead #1230-HS-30mil
- b. Directional drilling/boring – Copperhead SoloShot #1245-EHS

- c. Pipe bursting – Copperhead SoloShot Extreme – 7x7 stranded, HDPE Coated
- d. Terminate single wire at the back side of each hydrant inside 3" x 4' PVC pipe with a threaded cap if no hydrant is available install wire/s inside a separate Tyler #6860 top section set on bricks road box location field verified. All wires will have a minimum of 2' slack.
- e. All mainline tracer wires shall be interconnected in intersections, at mainline tees and mainline crosses.

2. DESIGN STANDARDS

- a. Tracer Wire Required on ALL mains and services.

3. INSTALLATION

- a. Open cut-Tracer wire will be Copperhead #1230-HS-30mil.
- b. Directional drilling/boring-Copperhead SoloShot#1245-EHS
- c. Pipe bursting-Copperhead SoloShot Extreme-7x7 stranded, HDPE Coated
- d. Terminate wire at the back side of each hydrant inside 3" x 4' PVC pipe with a FNPT x Spigot PVC DWV clean-out adapter with plug and threaded cap
- e. If no hydrant is available install wire/s inside a separate Tyler top section set on brick #6860
- f. Road box location field verified. All wires will have a minimum of 2' slack.
- g. All mainline tracer wires shall be interconnected in intersections, at mainline tees and mainline crosses
- h. Tracer wire splicing and connecting to existing tracer wires will use a Copperhead 3-Way Twist lock waterproof connector for 30mil for direct bury-Part #LSC1230B-CTR25. And at the hydrant lead use a "Service lateral lug" connector Part #3WB-01
- i. At the termination points install ground rod Copperhead #ANO-12. Connect the red wire to the blue tracer wire inside the 3" tube with a double wire lug connector.
- j. If no hydrant is available install wire inside a separate Tyler full gate valve box top section set on brick #6860 road box location field verified
- k. Install tracer wire from main to the building using "Copperhead" 1230-HS-Blue wire connect the new tracer wire to existing wire at the main using a Copperhead lockable waterproof connector for direct bury.
- l. Service Laterals-Terminate tracer wire by building using Copperhead ANO-12 termination rod, connect the red termination wire to the blue tracer wire using a standard wire nut sized for this wire and install the two wires in a 3" X 4' long PCV tube with thread cap. The exposed end needs to be a minimum of 6"-12" visible after finished grade.
- m. If tracer wire does not exist at the main, install the wire with the service and terminate wire at the main using a Copperhead ANO-12 termination rod. Splice the red wire with the blue wire using a Copperhead lockable waterproof connector for direct bury.
- n. Proper stripping of HDPE coating will be made using an approved electrical stripping tool, NOT a pocketknife.

- o. Service Lateral private property-Connect the red wire from the grounding rod and the blue tracer wire using a Copperhead waterproof connector-no ANO-12 termination is needed at the building.
- p. Install tracer wire in a 3" X 4' long PVC tube with thread cap. The exposed end needs to be a minimum of 6"-12" visible after finished grade.
- q. Testing-All new tracer wire installation shall be located using a low frequency line tracing equipment, witnessed by the inspector/owner/engineer. This verification shall be performed after rough grading and before finished grade and asphalt.

xii. TAPPING

1. MATERIALS

- a. Service saddles shall be used on all corporation valve sizes larger than 1", subject to specific pipe manufacturer restrictions for the pipe to be tapped. Saddles shall be all 304 stainless, double bolt saddle. Acceptable products for service sizes through 2" corps include, 360° full circumference:
 - i. Romac SS1
 - ii. Smith-Blair 264
 - iii. Power Seal 3131AS
 - iv. Hymax Tapped Clamp
 - v. Pre-approved equal.
- b. Tapping sleeves, that have a flanged outlet, shall be used when tapping all existing pipe in service for branch lines 3" and larger in size. The body shall be 304 stainless steel, have a minimum of 1/3 of the interior surface fully lined with a raised "donut" area around the branch opening, and a test port. All bolts, washers, and nuts shall be stainless steel. Acceptable tapping sleeves include:
 - i. Hymax Tap
 - ii. Romac Series SST with 204 stainless steel MJ Outlet
 - iii. Smith-Blair 663 – with stainless steel outlet
 - iv. ~~Power Seal 3480MJ CS Tapping Sleeve~~
 - v. Ford
 - vi. Pre-approved equal.

2. DESIGN STANDARDS

- a. Location of all taps, tapping devices or fittings/valves for ALL water pipes shall be in accordance with the following:
- b. The minimum distance from the beginning/end of the Bell or MJ of a water pipe, fitting or another tap shall be:

- i. Corporation direct tap = 2.0 ft.
- ii. Corporation Tapping Saddle (up to 2" size) = not less than 2.0 ft.
- iii. Branch Tapping Sleeve = not less than 4.0 ft.

3. INSTALLATION

- a. Activation of tap can only be authorized by the Water Utility after passing pressure tests and safe water tests. A Utility representative shall be present on-site during tapping and sleeve work and any connection(s) to existing main(s). Two working days advance notice before making the connection is required by the Water Utility.
- b. All taps to water mains shall be made under full system pressure, with the main full of water. No taps may be made on an inactive or non-pressurized main.
- c. All curb stops shall be installed under full system pressure prior to hydrostatic testing for acceptance of installation.
- d. When tapping, thoroughly clean and inspect the pipe surface. Wet the pipe surface with a soap/water solution prior to placing a saddle, sleeve or repair clamp. Confirm that the main OD falls within the tapping device's OD range. Ensure that the tapping device is properly aligned to connect with the branch pipe. Ensure that the tapered ends of the gasket are smooth, not folded or rolled in any manner.
- e. The saddle, sleeve or repair clamp shall be installed and all bolts finger-tightened for uniform gap. Tighten all bolts working from the ends to the center using torque wrenches in accordance with manufacturers specifications. After approximately 10 minutes to allow the gasket to fully compress, all bolts shall be re-tightened to manufacturer's specifications. Make sure the tapping device and tapping machine are fully supported and all cutting edges sharpened. Teflon tape or Teflon pipe dope shall be used on the corporation stop and all other pipe threads.
- f. If tapping device is for 3" or larger branch line, the sleeve shall have a test port and be tested at 100 psi for 5 minutes by the Contractor BEFORE the actual tap proceeds. A Water Utility representative shall witness the tapping device installation, pressure test and tapping procedure.
- g. All taps to existing and new mains shall be "live" or "wet" taps, utilizing a tapping machine with appropriate cutting tools and sharp cutting heads. All tap cut-outs shall be given to the Construction Inspector or Water Utility representative witnessing the tap.
- h. No taps will be permitted to begin after 1:00 P.M. Additionally, pre-approval by the Water Utility is required for tapping on a Friday or preceding a holiday.
- i. Two business days prior notice to Water Utility is required to be given prior to installation of new taps on existing mains.
- j. Notice shall also be given to the Superintendent of Water Utility (Department of Public Works 262-253-7780) for new taps on existing mains.

xiii. BEDDING/COVER/BACKFILL

1. MATERIALS

- a. Pipe Bedding: In accordance with SWS, Section 8.43.2: 3/8" limestone chips for PVC/PVCO pipe. No. 1 clean stone shall be placed within a 5 ft. radius of valves and valve boxes.

- b. Cover Material: In accordance with SWS, Section 8.42.2 & 8.43.3, 12" above top of pipe. No stone, rock or other similar material with a sieve size greater than 3/8" shall be permitted. Sand & gravel are prohibited.
- c. Granular Backfill: In accordance with SWS, Section 8.43.4, Table 39 Graded Aggregates, 1 1/2" graded limestone. In spot construction in trench lengths less than 50' Granular Backfill shall be crushed limestone per SWS, Section 8.43.6.
- d. Spoil Backfill: In accordance with SWS, Section 8.43.5. No stone, rock or other similar material with a sieve size greater than 3-inches shall be permitted within 2.0 ft. above or beside the pipe. For HDPE service lines, the sieve size shall not be greater than 1 1/4" within 2.0 ft. above or beside the pipe.
- e. Slurry Backfill: Aggregate slurry in accordance with SWS, Section 8.43.8, or in accordance with a street opening permit, when issued. In special cases, Village Engineer may require Sand Slurry consisting of 50 pounds of flyash and a 1/2 bag of Portland cement per cubic yard of mix.

2. DESIGN STANDARDS

- a. Mechanically compact all trench backfill per Section 2.6.14(b) of SWS. Conform to 95% Standard Proctor Density tested at Contractor's expense.
 - i. Initial lift – 2 ft. max; Subsequent lifts – 1 1/2 ft. max.
- b. Backfill in accordance with all street opening permit(s); generally, this will be slurry aggregate. All areas not within 5 ft. of paved surface (and above a 45-degree intercept line) may receive suitable spoil backfill as provided herein. Prohibited: Debris, frozen material, large clods or stones, organic material, blast rock, stones larger than 6", sand. Contractor shall haul away and dispose of these materials at Contractor's expense.

xiv. CAPS & PLUGS

1. MATERIALS

- a. Acceptable caps & plugs include:
 - i. Clow F-1155, F-1159 and F-1165 solid cap or pre-approved equal.
 - ii. Poured buttresses shall be used
 - iii. Mega-lugs or pre-approved equal shall also be used when appropriate.

xv. CASING/CARRIER PIPE

1. MATERIALS

- a. Installation of water lines within casings shall be accomplished by using Stainless Steel Casing Spacers installed in accordance with the manufacturer's recommendations. Spacers shall be:
 - i. Style CCS by Cascade Waterworks Mfg. Co. of Yorkville, IL
 - ii. Model 4810 by PowerSeal Pipeline Products of Wichita Falls, TX
 - iii. Pre-approved equal.
- b. End seals, installed on both ends of each casing, shall be:
 - i. Cascade Style CCES
 - ii. PowerSeal 4810ES
 - iii. Pre-approved equal.
- c. Water mains within the casing shall be installed with mechanical joints and mega-lugs or pre-approved equal.

2. DESIGN STANDARDS

- a. Casing watermain shall be used for all plastic pipe crossing a right-of-way and for all arterial crossings.

32.3 ABANDONMENT

i. GENERAL

- 1. All existing water mains and service lines that will not be used in new construction or re-used for reconstruction of existing building sites shall be abandoned at the main, unless approved by the Village Engineer or Water Utility.
- 2. A representative from the Village Engineering or Water Utility shall be present to witness the abandonment.
- 3. All excavations within public rights-of-way shall require Village and/or County Permits.
- 4. Excavations within 5 ft. of and under paved surfaces shall be backfilled with Slurry Aggregate per the SWS to within 1.0 ft. of surface, followed by appropriate street restoration and not less than 3-inches of binder and 2-inches of wearing surface bituminous pavements.
- 5. In special circumstances, when approved in writing by the Village Engineer, water service lines may be temporarily made inactive at the right-of-way or easement boundary. The service shut-off valve shall be turned off and the pipe plugged or capped at the property line. Water services not abandoned at the main shall meet the following conditions:
 - i. As part of the demolition permit, a certified check or Letter of Credit, in the amount of \$5,000 per lateral, shall be submitted to the Village Engineer to guarantee the permanent abandonment of the service at the main is completed in a timely manner.
 - ii. Any service line that is not abandoned at the main shall be subject to separate "availability" or "ready to serve" charges in the interim period until properly abandoned.
 - iii. Water lines made inactive in this manner shall be marked with a marker post placed 1 ft. from the end of the pipe and extending from the pipe to 3 ft. above the ground surface and painted a blue color.

- iv. The location of the terminal pipe locations shall be surveyed or otherwise “tied” to permanent objects that will remain undisturbed at the site, with an as-built drawing provided to the Village Engineer and Utility Department for record purposes.

ii. WATER SERVICES

1. All water services 2” diameter and smaller shall be abandoned at the street main by Turning off the main, remove the corp. and install a Hymax, Smith Blair 261 or equal stainless-steel repair clamp.
2. The remaining service line may be left in place, but the valve box/curb stop shall be removed. Backfill of gate valve box shall consist of stone and/or slurry.
3. The completed work shall be double wrapped with polyethylene per SWS, Chapter 6.21.0.
4. For water service lines larger than 2” diameter, the abandonment procedure would consist of:
 - i. Removal of the service shut-off valve (if at the main), plus 2 - 3 ft. of service pipe at the street main branch fitting. If a blind flange cannot be installed on the T, and the Village deems the fittings are defective the main will be shut down. Cut and remove that section of pipe fittings. Install new pipe with two water main couplers and wrap with baggy.
 - ii. Installation of a gasketed blind flange or MJ plug at the branch fitting, as appropriate.
5. All bolts and gaskets shall comply with these standards.
6. In the event that the shut-off valve is not at the street main branch fitting, then 2 - 3 ft of the service pipe shall be removed and a gasketed blind flange or plug installed onto the branch fitting at the main.
7. The valve box/curb stop shall be removed.

42.4 INSPECTION

i. SUBMITTALS AND SAMPLES

1. Material samples shall be taken as provided in SWS 8.1.0 and the Contract Documents.
2. All materials delivered to the Work Site shall have legible markings in accordance with ANSI, ASTM, AWWA and SWS 8.3.0.
3. All materials of each type or use shall be from a single manufacturer for the entire Contract.
4. Prior to the start of work, the Contractor shall submit six (6) sets of the following for approval:
 - i. Letter of Certification and representative test reports by manufacturer for all pipe delivered to the Work Site for EACH material item furnished.
 - ii. Representative test reports for EACH material item furnished to the Work Site.
 - iii. Installation manuals for all valves, operators, hydrants, etc.
 - iv. Maintenance manuals for all mechanical equipment furnished to the Work Site.
 - v. Generally, installation shall be in accordance with SWS and as modified by these Specifications.
 - vi. All material specifications to be in PDF form.

ii. DISINFECTING

1. No chlorination or flushing between safe samples.
2. Use only calcium hypochlorite tablets affixed to the top interior wall of the pipe (no powder) to disinfect pipelines and service/fire lines in accordance with SWS, Section 4.3.12. The **Contractor Water Utility** will collect samples of the chlorinated water for safe water testing. Contractor shall supply all labor assistance to flush mains and to take sample(s). **The Water Utility will provide chain of custody bags that will be sealed with the sample onsite.**
3. **The samples will be taken to a State Certified lab, the water will not be turned back on for new main construction, new development, or new facilities until the Water Utility receives the sample test results.**
4. Water wasted to surface may not contain any substances in concentrations that adversely affect the water as determined by the Wisconsin Administrative Code, NR 105 and 106. For chlorine, no total residual chlorine may be measured in the water being discharged to a surface water greater than ambient total chlorine residual in system water supply (typically 0.5 mg/L). Advise the Water Utility and Village Engineer of proposed discharge schedule to arrange DNR-required chlorine residual measurements for main flushing water.

iii. ACCEPTANCE TESTING

1. General
 - a. Pressure and leakage testing shall include all installed system components, such as mains, branches, services and fire protection taps to terminus of all lines to be installed under the Contract.
 - b. Two (2) business days' notice to the Engineering Department (262-250-4721) and Water Utility shall be required.
 - c. Water for filling, testing and flushing for safe sampling of watermain will be supplied only by permission of the Water Utility via permit. All water that is used for filling new mains, pressure testing, flushing of mains, trench flushing, and safe sampling etc., will be witnessed by an inspector or Utility employee. Water used will be charged at the current rate.
2. Tests
 - a. Prior to pre-punch list work, tracer wires shall be tested by Contractor prior to Village accepting the work. The Utility Department has the option to spot check the continuity of the tracer wires.
 - b. Pressure and leakage tests shall be performed in accordance with SWS and under the jurisdiction of the Engineering Project Inspector and Water Utility.
 - c. Pressure Test: After the test connections are made and the main filled with water, the test section shall be subjected to water pressure normal to the area. After examination of exposed parts of the system, the test pressure will be increase to 150 psi on the main at the lowest elevation. The main shall be examined and if any defects are found, the Contractor shall immediately make the necessary repairs at his own expense. The pressure test shall be repeated until no defects can be found. The duration of the final pressure test shall be one hour. The pipe shall pass if the final pressure is within 5% of the test pressure for 1 hour. If it is found

unnecessary to add water during the duration of the pressure test, the leakage test may be waived at the direction of the Inspector/engineer or Water Utility. If waived by the Inspector and Water Utility, a combination leak/pressure test will be performed.

- i. For HDPE pipe, test duration to be less than 8 hours. If testing is not completed for any reason, de-pressurize and allow to “relax” for 8 hours before resuming test.
- ii. PVC Pipe: Conform to Standard Specifications Ch. 4.15.0
- iii. Test shall include a Bac-T safe sample.
- d. Leakage Test: The leakage test, if required, shall be conducted after satisfactory completion of the pressure test. The test section shall be subjected to approximately 100 psi gauge pressure at the point of highest elevation of the main under test. The duration of the leakage test shall be two hours unless otherwise specified. Should any test section fails to meet the leakage test, the Contractor shall immediately make the necessary repairs at his own expense. The duration of the final leakage test shall be one continuous hour.
- e. Fire and Combination water/fire service lines shall be tested at 200 psi for 2.0 hours.
- f. Contractor is responsible for taking samples, witnessed by the Village or onsite inspector and samples put in a sealed chain of custody bag provided by the Village.
 - i. No first sample will be taken on a Friday, weekend, or adjacent to a holiday.
 - ii. Bacteriological Testing: Conform to Standard Specifications Ch. 4.16.0 and NR 811.07. Contractor shall provide analysis results to Village Engineering Dept in PDF form. If the bacteriological test fails, conform to Standard Specifications Ch. 4.16.3 to re-chlorinate the main.
 - iii. No Bac-T sample will be accepted if the sample is not taken from a smooth bore sample tap upstream from the discharge flowing pipe. Samples from a hose spigot will not be accepted.
- g. Tracer Wire Connectivity: All new tracer wire installation shall be located using a low frequency line tracing equipment, witness by the inspector/owner/engineer. This verification shall be performed after rough grading and before finished grade and asphalt.

52.5 OTHER REQUIREMENTS

- i. Specifications
 1. Contractor shall be responsible for Digger’s Hotline locates, site safety, resident access, traffic control, erosion & sediment control, and protection of existing facilities, features and structures at all times
 2. At end of each day and during breaks, Contractor shall install waterproof, leak-proof plugs.
 3. At the end of each day, open excavations shall not exceed 25 ft. in length.
 4. All lateral trenches shall be backfilled at end of day.
 5. At end of each day, contractor shall erect barricades with flashers and snow fencing surrounding excavations.
 6. Mainline Installation: Conform to Standard Specifications Ch. 4.3.0 Sawcut Exist Pavements: Wheel-mounting saw required. Sawcut full depth.
 7. List of Standard Village Details
 - i. HDPE Hydrant Branch
 - ii. Standard Hydrant Bollard
 - iii. Relocate Water Main HDPE Pipe
 - iv. Relocated Existing Water Main PVC Pipe Only
 - v. HDPE Joint Restraint

- vi. Water Main Reconnection
- vii. Water Main Service Lateral Schematic
- viii. Tracer Wire Construction Layout
- ix. Sample Station Detail
- x. Meter Sizes/Laying Lengths and Charges
- xi. Bulk Water Purchasing Process and Charges

TABLE OF CONTENTS

3 SANITARY SYSTEM	45
3.1 SPECIFICATIONS	45
3.1.1 SANITARY SEWER MAIN AND LATERALS.....	45
3.1.2 SANITARY FORCE MAIN	47
3.1.3 TRACER WIRE	48
3.1.4 BEDDING/COVER/BACKFILL	49
3.1.5 SANITARY MANHOLES	51
3.1.6 SANITARY SEWER LATERALS (From main to lot line)	54
3.1.7 LATERAL CONNECTIONS	55
3.1.8 CASING PIPE	56
3.1.9 TRENCH CHECK DAM	57
3.1.10 POLYETHYLENE WRAP & CORROSION PROTECTION	57
3.1.11 GREASE INTERCEPTORS	58
3.1.12 LIFT STATIONS	59
3.1.13 INSULATION	59
3.2 ABANDONMENT	60
3.3 INSPECTION	61
3.3.1 SUBMITTALS AND SAMPLES	61
3.3.2 ACCEPTANCE TESTING	62
3.3.3 CLEANING	63
3.3.4 CCTV	64

3. SANITARY SYSTEM

All labor and material shall be governed by requirements of the Milwaukee Metropolitan Sewerage District (MMSD) and the latest edition and all amendments thereto of the Standard Specifications for Sewer and Water Construction in Wisconsin (SWS), Public Service Commission (PSC) Rules and Wisconsin Department of Natural Resources (WDNR) Regulations, WisDOT Standard Specifications for Highway and Structural Construction, Chapter DSPS 382, and Village of Germantown Municipal Code unless otherwise specified in these Specifications, whichever is more restrictive.

3.1. SPECIFICATIONS

3.1.1. SANITARY SEWER MAIN

3.1.1.1. MATERIALS

3.1.1.1.1. All pipe used for sanitary and private main interceptor sewers shall be:

- A. PVC (solid wall) SWS Section 8.10.0, ASTM D-3034, SDR-26, SDR-35
- B. PVC (solid wall, green in color for in-ground identification) SWS Section 8.20.0, AWWA C-900 or C-905
- C. Or Engineer approved equal

3.1.1.2. DESIGN STANDARDS

3.1.1.2.1. Design flow coefficients as determined by the Village Engineer, subject to the following:

A. Residential/Multi-Family (Per MMSD Flow Allocation Worksheet):

Base Sanitary Flow	102 gpcd
Max Daily	1,269 gpcd
Residential densities are to be determined per MMSD Annual Cost Recovery Manual	

B. Industrial & Institutional Areas (Per MMSD Flow Allocation Worksheet):

Base Sanitary Flow	1,500 gpd/Acre
Max Daily	3,250 gpd/Acre

C. Large Commercial (Per MMSD Flow Allocation Worksheet):

Base Sanitary Flow	2,250 gpd/Acre
Max Daily	4,000 gpcd/Acre

3.1.1.2.2. Design flows and peaking factors are to be referenced to MMSD Rules and Regulations and as determined by the Village Engineer. Design objectives shall result in elimination, to the greatest extent possible, of all infiltration and inflow.

3.1.1.2.3. Minimum Main and Lateral Sizes:

Residential	8" main / 6" Lateral
Industrial/Commercial/Multi-Family & PUD	8" main / 6" Lateral
Shall accommodate future tributary areas as directed by the Village Engineer	

3.1.1.2.4. Minimum slopes.

A. Pipes slopes shall achieve self-cleansing velocities for peak design flows as directed by the Village Engineer. Generally, minimum velocity of 2.0 fps shall be met at half-full conditions.

Pipe Size	Minimum Slopes
8"	0.40% (Dead end reach 0.60%)
10"	0.28% (Dead end reach 0.40%)
12"	0.22%
15"	0.15%
18"	0.12%
21"	0.10%
24"	0.08%
Other Sizes	Per Engineering Services Division

3.1.1.2.5. Complete sewer design calculations and sewer system plans are required with construction plan submittals.

3.1.1.2.6. Conceptual sewer system plans are required for proposed developments located within the Ultimate MMSD Service Area even if sanitary sewer currently is not available. A determination is needed at the conceptual stage that future gravity sewer systems will work when needed.

3.1.1.2.7. Center of manhole shall coincide with street centerline, and center of main shall be within 5 feet of centerline on curvilinear street segments.

3.1.1.2.8. Invert shall not be less than:

Distance below the centerline grade of the street	Road ROW Width
11.0 Feet	60/66 FT
12.0 Feet	80 FT
13.0 Feet	>80 FT and Cul-De Sacs

3.1.1.2.9. Minimum sewer depth shall be 8 feet from finished grade to top of pipe under exceptional circumstances and approval of Village Engineer. Sewer depths shall provide gravity flow for basement floor drains and plumbing fixtures. "Hung" services are prohibited. Grinder pumps may be considered by Village Engineer.

3.1.1.2.10. Pipe with cover depth of greater than 20 feet shall have the pipe material approved by the Village Engineer and shall be designed conforming to Standard Specification Ch. 5.3.12 and Table 12.

3.1.1.2.11. All sewer pipes shall be laid in accordance with SWS, Chapter 3.2.0

3.1.1.2.12. All connections to manholes shall be in accordance with SWS, Section 3.5.7.

Connections to manholes with preformed troughs in the bench shall be made in accordance with the procedure described in Section 3.1.7.3.5.

3.1.1.2.13. All sewer pipes shall terminate with top of pipe flush to the inside wall of the manhole. All annular spaces shall be filled with a cementitious filler to prevent the breakage of the pipe while cleaning.

3.1.2. SANITARY FORCE MAIN

3.1.2.1. MATERIALS

3.1.2.1.1. All pipe used for sanitary force (pressure) mains shall be:

- A. PVC (solid wall) SWS 8.51.2, AWWA C-900 or C-905
- B. PVCO AWWA C-909, Class 150
- C. High density black Polyethylene Force Main Pipe SWS 8.51.3, ASTM F-714; or Green Stripe
- D. Fusible PVC C-900
- E. Linked PVC C-900

3.1.2.1.2. All pipe shall conform to Ductile Iron Pipe OD.

3.1.2.1.3. Valves shall be:

- A. Dezurik Series 100 Eccentric Valves cast iron epoxy-coated body, hard rubber-lined, MJ,
- B. low friction Buna-vee packing, neoprene plug facing, ABG6H6 actuator, with stainless steel bolts, and plug valve adaptor bracket with valve box
- C. Alternatives shall be pre-approved by the Village Engineer.

3.1.2.2. DESIGN STANDARDS

3.1.2.2.1. Minimum design depth shall have 8 feet of cover.

3.1.2.2.2. Buried tracer location wire is required above the force main.

3.1.2.2.3. Maximum spacing of location boxes: 300 feet or as directed by the Village Engineer.

3.1.2.2.4. Velocity/Size:

- A. Hazen-Williams formula "C" value of 120.
- B. Velocity 2.0 – 6.0 fps for lowest energy pumping cost, as approved by the Village Engineer.

3.1.2.2.5. High/Low Points:

- A. Air relief valve sizing calculations shall be submitted with Plans. A.R.I to be used.
- B. Clean-outs shall be installed at designated points.
- C. 6-ft. diameter manhole enclosures shall be installed.

3.1.2.2.6. HDPE Connections & Fittings: Joined by heated butt fusion for HDPE. Conform to ASTM D2657 and manufacturer specifications. Internal/external beads shall not be removed.

3.1.2.2.7. HDPE Main & branch joints: Joined by electrofusion conforming to manufacturer specifications. Internal/external beads shall not be removed.

3.1.2.2.8. PVC water class pipe. 4" thru 12" dia. = Class 150-DR18 conforming to AWWA C-900, conforming to standard specifications Ch. 4.6.0 and 8.20.01.

- A. Fittings = ductile iron conforming to Standard Specification 8.22.0.

- B. 4" thru 12" dia. = Class 250 mechanical joints
- C. Nuts & Bolts = Cor-Blue
- D. Mechanical joint retainer glands = Mega-Lug; Buttresses also required.
- E. Tees, crosses, bends, offsets, and other fittings shall conform to Standard Specification CH. 8.22.0. Acceptable supplier shall be Tyler or equal.
- F. Triple wrap all ductile iron fittings with polyethylene. Conform to Standard Specifications Ch. 4.4.4 and 8.21.0

3.1.2.3. Warning Tape

- 3.1.2.3.1. Terra Tape Standard 250 manufactured by Reef Industries, Inc., Shieldtec manufactured by Empire Level Manufacturing Corp., Milwaukee, WI, (or Engineer approved equal). Tape shall read "Caution – Sanitary Line Buried Below". Tape shall be green and 3" wide. Install over the cover material.

3.1.3. TRACER WIRE

3.1.3.1. MATERIALS

- 3.1.3.1.1. Tracer wire for sanitary laterals shall be "Copperhead" 1230-HS-Green wire.
- 3.1.3.1.2. Tracer wire for force main shall be "Copperhead" 1230-HJS-Green wire.
- 3.1.3.1.3. Tracer wire for directional drilling/boring shall be "Copperhead" #1245-EHS.
- 3.1.3.1.4. Tracer wire for pipe bursting shall be "Copperhead" Soloshot Extreme – 7x7 Stranded, HDPE coated.
- 3.1.3.1.5. Connectors for open cut laterals shall be a Snakebite Twistlock or direct bury lug connector.
- 3.1.3.1.6. Termination of lateral tracer wire at main shall be a ground rod "Copperhead" @ANO-12. Connect the red wire to green wire using Twist Lock or buried lug connector.

3.1.3.2. DESIGN STANDARDS

- 3.1.3.2.1. Tracer wire shall be required on all force mains.
- 3.1.3.2.2. Tracer wire shall be required on all laterals.
- 3.1.3.2.3. Tracer wire shall be required on all directionally drilled pipe.

3.1.3.3. INSTALLATION

- 3.1.3.3.1. Contractor shall verify during backfilling of cover material that the tracer wire has remained on top of the lateral.
- 3.1.3.3.2. Connections with the tracer wire shall require approval by Wastewater Superintendent.
- 3.1.3.3.3. Lateral tracer wire shall be terminated at start-end points. At the main use a ground rod and at ROW run to surface with a minimum of 2 feet of wire wrapped around marking post.
- 3.1.3.3.4. A 1½" diameter PVC sch. 40 pipe with screw cap to be used at termination point when extended to dwelling. A 1.5-ft. pigtail of excess tracer wire shall stick out of the top of the pipe.

3.1.3.4. Testing

- 3.1.3.4.1. All tracer wire shall be tested prior to acceptance by Village Engineer. Testing by using a radio frequency locator.

3.1.4. BEDDING/COVER/BACKFILL

3.1.4.1. MATERIALS

- 3.1.4.1.1. Pipe Bedding/Cover: In accordance with SWS, as follows –
- A. Flexible wall pipe shall be Class “B” up to 12” above top of pipe; 3/8”-5/8” limestone chips.
 - B. Rigid wall pipe with diameters equal to or less than 21” shall have 3/8”-5/8” limestone chips up to 12” above top of pipe.
 - C. Rigid wall pipe with diameters greater than 21” shall have ¾” limestone chips up to 12” above top of pipe.
 - D. Ductile Iron pipe shall be Class B to 12” above top of pipe, torpedo sand.
 - E. Fittings/Valves shall be Class B to 12” above top of pipe, torpedo sand.
- 3.1.4.1.2. Cover Material: In accordance with SWS, Section 8.43.3. No stone, rock or other similar material with a sieve size greater than 1” shall be permitted.
- 3.1.4.1.3. Granular Backfill: In accordance with SWS, Section 8.43.4. No stone, rock or other similar material with a sieve size greater than 3” shall be permitted. Granular backfill shall be crushed recycled concrete or crushed limestone per SWS, Section 8.43.6.
- 3.1.4.1.4. Spoil Backfill: In accordance with SWS, Section 8.43.5. No stone, rock or other similar material with a sieve size greater than 3” shall be permitted within 2.0 ft. above the pipe. Not allowed under pavement or stone walkways.
- 3.1.4.1.5. Slurry Backfill: Aggregate slurry in accordance with SWS, Section 8.43.8 and requirements of Village Engineer, or in accordance with street opening permit, when issued. In special cases, Village Engineer may direct the use of Sand Slurry consisting of 50 pounds of fly ash and a ½ bag of Portland cement per cubic yard of mix.
- 3.1.4.1.6. Prohibited: Debris, frozen materials, large clods or stones, organic material, black rock (uncrushed), stones/rocks larger than 3”, and sand. Contractor shall haul away and dispose of these materials at contractors expense.
- 3.1.4.2. DESIGN STANDARDS
- 3.1.4.2.1. Backfill in accordance with all street opening permit(s), generally will be slurry aggregate. All areas greater than 5 ft. from a paved surface (and above a 45-degree intercept line) may receive suitable spoil backfill as provided herein.
- 3.1.4.3. INSTALLATION
- 3.1.4.3.1. Care shall be taken by the Contractor when backfilling to prevent any movement of the pipe from proper alignment and grade. Contractor is responsible for determining that the finished sewer remains at the required elevation and grade.
- 3.1.4.3.2. Mechanically compact all trench backfill to a minimum 95% standard Proctor density per SWS, Section 2.6.14(b). The initial lift to be compacted shall have a 2 ft. loose thickness. Each subsequent lift to be compacted shall have a maximum 18” loose thickness. Contractor shall place smaller lifts if the required compaction cannot be achieved.

3.1.5. SANITARY MANHOLES

3.1.5.1. MATERIALS

- 3.1.5.1.1. All sanitary manholes shall be pre-cast concrete conforming to Standard Specifications Ch. 8.39.0 and File No. 12

3.1.5.1.2. All sanitary manholes shall have a wall thickness of 5" minimum.

3.1.5.1.3. The manholes shall be sized as follows:

Downstream Pipe Size	Minimum Manhole I.D.
8-24"	48"
30-42"	60"
>42"	72"
Sampling Manholes	48" (No flat decks allowed)

3.1.5.1.4. All sanitary and sampling manhole cone sections shall be eccentric. Concentric cones are prohibited.

3.1.5.1.5. All manholes shall have spray epoxy coating:

- A. MH Exterior: 2 coats (black) of Ameron International, Amercoat 78 HB at 8-10 mils. each.
- B. MH Interior: 2 coats (white) of Permite PCS-9043 Type II Permax pipe glaze at 20 mils. each.
- C. Coatings shall be applied by suppliers at the plant.

3.1.5.1.6. All joint seals shall consist of one of the following:

- A. Kentseal butyl rubber sealant
- B. Or Engineer approved equal
- C. External joint seals shall consist of following:
- D. MacWrap External Joint Sealers by MarMac Manufacturing
- E. Or Engineer approved equal

~~3.1.5.1.7. External joint seals will have 9" wide collar, outer layer of polyethylene, min. 4000 psi tensile strength, min. 1500 psi tear resistance, under layer of rubberized mastic reinforced with woven polypropylene fabric.~~

~~3.1.5.1.8. External joint seals will have 2 stainless steel straps within the collar ¾" from edges confided with tube isolated from mastic and allowed to slip freely.~~

~~3.1.5.1.9. External joint seals will have minimum 6" overlap with closing flap to cover straps.~~

3.1.5.1.10. External for MH w/ Precast Outside Drop: EZ-Wrap by Press Seal Gasket Corp. primed with EZ-Stick No. 4 Primer

- A. Extruded butyl adhesive tape bonded to the concrete.

3.1.5.1.11. Chimneys shall use HDPE or EPP 5000 Series rings meeting ASTM D4976 or ASTM D3575. Precast concrete rings are not allowed.

3.1.5.1.12. Chimneys shall have a minimum height of 2" and a maximum height of 16".

3.1.5.1.13. HDPE Rings in pavements:

- A. Drill two ½" diameter holes 180° apart on mandatory 2" thick EPP ring (Cretex part number 40-27GF-200). Drill into corbelled section of the manhole, ring shall be drilled prior to placing on manhole.
- B. Apply 2 beads of M-1 adhesive 1/2"x1/2" in a continuous circle on corbal. Install drilled EPP ring and anchor
- C. with a 4" Rawl Power Bolt utilizing a 2" diameter fender washer. Tighten until bolt head is flush with the top of the 2" ring.
- D. Install ¾" Ladtech topper ring set in M-1 Adhesive as described above.
- E. Dry stack chimney to proper height, including solid HDPE topper ring. Pay special attention to slope and use appropriate slope rings.
- F. Once desired height and slope are achieved, mark rings to align desired stacking order and placement.

- G. Apply bead of caulk around lip of adjusting ring and re-stack rings. Apply 2 beads of caulk on topper ring, one towards the outside and one towards the inside. Topper ring does not have a locking lip so be cautious ring does not slip during seal installation.
- H. Install seal per manufactures specifications.
- 3.1.5.1.14. Adhesives: M-1 (Chem-Link Corp.) used on EPP rings. Gun grade butyl rubber adhesive sealant on HDPE rings.
- 3.1.5.1.15. Seals to have order-to-fit Adapter internal/external with rubber sleeve sealing exterior from frame to corbel.
- 3.1.5.1.16. PE wrap to be installed using double 6 -mil polyethylene wrap from top of frame to 84" min. depth.
- 3.1.5.1.17. EPP Rings in turf to adhere to following:
 - A. Drill two ½" diameter holes 180° apart on mandatory 2" thick EPP ring (Cretex part number 40-27G-200). Drill into corbelled section of the manhole, ring shall be drilled prior to placing on manhole.
 - B. Apply 2 beads of M-1 adhesive 1/2"x1/2" on corbal. Install drilled EPP ring and anchor with a 4" Rawl Power Bolt utilizing a 2" diameter fender washer. Tighten until bolt head is flush with the top of the 2" ring.
 - C. Dry stack chimney to proper height, including solid Grade Finish ring. Pay special attention to slope and use appropriate slope rings.
 - D. Once desired height and slope are achieved, mark rings to align desired stacking order and placement.
 - E. Apply 2 beads of M-1 in keyway area of adjusting rings and re-stack rings.
 - F. Adjusting rings will be lag bolted in 4" height increments with a ½" x 5" steel wood lag bolt and 2" fender washer with bolts alternating 180° apart with each 4" rise in height
 - G. Install seal per manufacturer's specifications.
- 3.1.5.1.18. For frames in pavement, use Neenah R-1661 frame with solid gasketed lid and 2 concealed pick holes. Conform to Standard Specifications Ch. 3.5.0 For frames in turf, use: Neenah R-1661 bolt-down frame w/ solid gasketed lid and 2 concealed pick holes. Conform to Standard Specifications Ch. 3.5.0. Bolts coated with anti-seize compound. Frames to be anchored to chimney with 1/2" dia. steel wood lag bolts extending 6" into chimney or to a depth that is practical for the chimney height and sealed with Permatex Ultra Series black, blue or grey silicone adhesive.
- 3.1.5.1.19. Pavement Ring required to be Neenah R-1979 Series Ref. #1661-7158.
- 3.1.5.1.20. Pavement ring elevations as follows:
 - A. Top of frame equal to binder grade **less ¼"**
 - B. 2" Paving rings used for surface lift adjustment.
- 3.1.5.1.21. Grout, if approved by Village Engineer and Utility Superintendent, can be acrylamide or polyurethane grout for manhole repair/rehabilitation.
- 3.1.5.2. DESIGN STANDARDS
 - 3.1.5.2.1. Maximum manhole spacing for 15" diameter or less DIPS mainline = 400'.
 - 3.1.5.2.2. Maximum manhole spacing for > 15" diameter DIPS mainline shall conform to NR 110.13(3)(b).
 - 3.1.5.2.3. Manholes shall connect 2 pipes having differing diameter.
 - 3.1.5.2.4. Minimum elevation difference between influent and effluent pipes in manholes = 0.1'.
 - 3.1.5.2.5. Maximum elevation difference between influent and effluent pipes without outside drop in manholes = 2.0'.

- 3.1.5.2.6. Lift holes: Exterior lift holes only (interior lift holes are prohibited).
- 3.1.5.2.7. Full benches are prohibited. Conform to Standard Specifications Ch. 3.5.4© and File No. 13. w/e full benches and with long radii.
- 3.1.5.2.8. Outside drops to conform to Standard Specifications Ch. 3.5.8 and Fil No. 19/20
- 3.1.5.2.9. One full-length of pipe shall precede the tee connecting the manhole and the drop segment.
- 3.1.5.2.10. Elevation for top of frame shall be equal to binder grade **less $-\frac{1}{4}$ "**. **2"** Paving ring required for surface lift adjustment.
- 3.1.5.2.11. Connections shall be cored. Cutting or breaking is prohibited.
- 3.1.5.2.12. Bulkheads for future connections are prohibited.
- 3.1.5.2.13. Manhole steps shall conform to Standard Specifications Ch. 2.5.4(g) and 8.40.0, and File #15 and #12. Steps in chimney are prohibited.
- 3.1.5.2.14. Sampling manholes are required at all commercial laterals and shall conform to Village of Germantown standard detail.
- 3.1.5.2.15. Sampling manholes to be minimum 48" diameter. No flat deck allowed.
- 3.1.5.2.16. Minimum elevation difference between influent and effluent pipes in manholes = 0.1'.
- 3.1.5.2.17. Manhole installations to be inspected by Village Engineer or **Wastewater** Utility.

3.1.6. SANITARY SEWER LATERALS (From main to lot line)

3.1.6.1. MATERIALS

- 3.1.6.1.1. All pipe used for sanitary laterals shall be:
 - A. PVC (solid wall) SWS 8.10.0, ASTM D-3034, SDR-35 or 26
 - B. PVC (solid wall) SWS, Section 8.20.0, AWWA C-900 or C-905
- 3.1.6.1.2. Risers shall be as required by the plans in accordance with these standards or as pre-approved by the Village Engineer.
- 3.1.6.1.3. Risers (shall be tees): Minimum depth below road centerline shall be per Section or 5 feet below basement, whichever is greater. Sewer depth to be greater than 14 feet for riser. (Per SWS File Nos: 10A, 10B, 10C, 10D, & 10E).
- 3.1.6.1.4. Tracer wire required on laterals. See section 3.1.3 for specifications.

3.1.6.2. DESIGN STANDARDS

- 3.1.6.2.1. Sites are allowed one (1) sanitary lateral connection. In special circumstances, additional laterals may be allowed with the written permission of the Village Engineer and the Wastewater Superintendent and with approval of the State.
- 3.1.6.2.2. Minimum size shall be 6" diameter.
- 3.1.6.2.3. Slope at $\frac{1}{4}$ " per foot. Under exceptional conditions, the Village Engineer may permit minimum slope = $\frac{1}{8}$ " per foot in ROW/easement.
- 3.1.6.2.4. All connections to existing mains and manholes shall be in accordance with Section 3.1.5.
- 3.1.6.2.5. Lateral connections to manholes shall not be made unless pre-approved by the Wastewater Superintendent. Connections to manholes in new construction shall not be above the outlet sewer crown and have a smooth paved channel constructed to convey lateral waste to main outlet channel.

- 3.1.6.2.6. Laterals may not connect to manholes except in cul-de-sacs (permanent end of line). In cul-de-sacs, special manhole detail and construction of benches and lateral pipe connections are required.
- 3.1.6.2.7. If it is deemed necessary to install a lateral to an existing manhole, and the manhole has to be cored and booted to accept this lateral, this manhole shall be vacuum tested according to the SWS.
- 3.1.6.2.8. Existing laterals not used in a development shall be abandoned at the main when a development, land division or building razing occurs. See Section 3.2.
- 3.1.6.2.9. Each habitable building shall have a separate lateral connection to the sewer main.
- 3.1.6.2.10. Sanitary laterals shall have a trench check dam installed at the property line. See Specification 3.1.4.

3.1.7. LATERAL CONNECTIONS

- 3.1.7.1. Connection of New Sanitary Laterals to Existing Mains shall be as follows based on existing main material:
 - 3.1.7.1.1. ABS - Truss Pipe
 - A. Location - not closer than 36" to an existing joint or fitting.
 - B. Hole - Core drill or saw-cut with appropriate cutting tools. Deliver "cut-out" to Construction Inspector or Utility Department representative.
 - C. Insert Tee only allowed connection. With exception on 8" only, a wye shall be used.
 - 3.1.7.1.2. Concrete Pipe
 - A. Location - not closer than 24" to an existing joint or fitting.
 - B. Hole - Core with appropriate cutting tools. Deliver "cut-out" to Construction Inspector or Utility Department representative.
 - C. Insert Tee only allowed connection. With exception on 8" only, a wye shall be used.
 - 3.1.7.1.3. PVC Pipe
 - A. Location - Not closer than 36" to an existing joint or fitting.
 - B. Hole - Core drill or saw-cut with appropriate cutting tools. Deliver "cut-out" to Construction Inspector or Utility Department representative.
 - C. Insert Tee on 10" and greater pipe and manufactured wye on 8" pipe and below shall be used, with repair coupling. Fernco coupling will not be allowed.
 - 3.1.7.1.4. Vitrified Clay Pipe
 - A. Location - not closer than 24" to an existing joint or fitting.
 - B. 8" wye shall be installed for connection device with PVC pipe up and down with Fernco **Strong Back** connection device.
 - 3.1.7.1.5. Due to increasing incidents with plugs being left in sewer lines, the Village of Germantown Utility Department is requiring Contractors use a mechanical plug only. This shall be performed and documented by the Germantown Utility personnel. The Germantown Utility shall be notified when a plug is to be removed.
 - 3.1.7.1.6. Prior to applying curing material on the concrete, the face of the curb shall be "branded" with a "S" designating the location(s) of sanitary laterals. Physical placement of the branding shall be reasonably accurate in a vertical plane above the respective lateral.

3.1.7.2. Connection of New Sanitary Laterals to Existing Sanitary Manholes will only be allowed on a case-by-case basis and when pre-approved by the Director of Public Works or their designee, and shall be subject to following requirements:

3.1.7.2.1. Location: Invert of new lateral may be permitted a maximum of 12" above spring line of outlet sewer, or use outside drop inlet per SWS for main sewers;

3.1.7.2.2. Connection Device: Kor-N-Seal boot or pre-approved equal with stainless steel snap-in ring.

3.1.7.2.3. Any lateral that is connected into a manhole shall have a smooth concrete bench/channel placed to convey lateral waste flow into mainline channel.

3.1.7.2.4. Prior to applying curing material on the concrete, the face of the curb shall be "branded" with a "S" designating the location(s) of sanitary laterals. Physical placement of the branding shall be reasonably accurate in a vertical plane above the respective lateral.

3.1.8. CASING PIPE

3.1.8.1. MATERIALS

3.1.8.1.1. Installation of sewer lines and force mains within casings shall be accomplished by using Stainless Steel Casing Spacers installed in accordance with the manufacturer's recommendations. Spacers shall be:

- A. Cascade Style CCS; or
- B. PowerSeal 481; or
- C. Pre-approved equal.

3.1.8.1.2. End seals shall be installed on either end of each casing and shall be one of the following:

- A. Cascade Style CCES; or
- B. PowerSeal 4810 ES; or
- C. Pre-approved equal.

3.1.8.1.3. Force main piping within the casing shall be installed with mechanical joints and megalugs.

3.1.9. TRENCH CHECK DAM

3.1.9.1. MATERIALS

3.1.9.1.1. Clay material shall have no organic material and shall be compacted to 95 percent standard proctor. Or;

3.1.9.1.2. Pre-approved equals such as: AquaBlok®, slurry and others.

3.1.9.2. DESIGN STANDARDS

3.1.9.2.1. Trench check dam shall be installed on all sanitary laterals.

3.1.9.2.2. The check dam shall be located at the property line.

3.1.10. POLYETHYLENE WRAP & CORROSION PROTECTION

3.1.10.1. MATERIALS

3.1.10.1.1. Polyethylene film materials shall comply with SWS, Section 8.21.0.

3.1.10.2. DESIGN STANDARDS

3.1.10.2.1. All metallic pipe, fittings and valves shall be wrapped and protected per SWS, Section 4.4.4 and 4.4.5.

3.1.11. GREASE INTERCEPTORS

All buildings with food service preparation on-site (now or at any future time) shall be required to install, maintain, and operate an exterior or interior grease interceptor tank sized in accordance with the Department of Safety and Professional Services (DSPS). State plumbing reviews by the DSPS shall be completed before a plumbing permit will be issued. Construction of the Grease Interceptor shall, in addition to requirements of the Plumbing Code, conform to the following standards. These standards are intended to minimize the potential for groundwater infiltration and inflow or rainwater from entering the sanitary sewer system via this system component.

3.1.11.1. MATERIALS

3.1.11.1.1. Interior grease interceptors shall be constructed in a watertight manner of one of the following materials:

- A. Precast reinforced concrete
- B. Reinforced monolithic concrete
- C. Coated 12-gauge steel
- D. Fiberglass
- E. Plastic
- F. Other approved materials

3.1.11.1.2. Exterior grease interceptors shall be pre-cast concrete with integral base when required by the Village Engineer and shown on the Plans.

3.1.11.1.3. Exterior grease interceptors shall be equipped with water-tight locking frame and lids.

3.1.11.1.4. The exterior walls of the tank shall be coated with coal-tar epoxy per SWS, Chapter 8.49.2, (2 coats at 8 mil DFT minimum each, totaling 16 mil DFT minimum). The coating material shall be equal to:

- A. Tnemec Series 253 H.S. Tnemec Tar; or
- B. ICI Devco DEVTAR 5A; or
- C. Pre-approved equal.

3.1.11.1.5. Coating(s) shall be applied in accordance with the coating manufacturer's recommendations and preferably at the place of tank manufacture. Each manhole section shall be inspected and marked for proof of inspection prior to delivery to the project site. Alternate waterproofing materials and application may be used if pre-approved by the Village Engineer. Manhole sections that are not properly coated with coal-tar epoxy will be rejected and shall be removed from the project site.

3.1.11.1.6. All barrel joints shall have a mastic or gasket type joint seal. The exterior shall be wrapped with an additional joint seal that meets requirements of ASTM C-877, Type II, such as "Mac-Wrap" or pre-approved alternate.

3.1.11.1.7. All manhole or tank access or inspection chimneys will be HDPE or EPP adapter seal frame – R1661 – Bolt down.

3.1.11.2. DESIGN STANDARDS

3.1.11.2.1. The approach section of pipe approaching the tank shall be straight for a distance of at least 20 pipe diameters with no connections, drops, or bends.

3.1.11.2.2. There should be no grade changes, angle points, or connections at the structure.

3.1.11.2.3. In Flood Plain Areas: Tank access or inspection chimneys shall be 2.0 feet above 100-yr Flood elevations as determined via FEMA Mapping.

3.1.11.2.4. When practicable, grade earth at 5H:1V slope around manhole openings. In paved areas, slope drainage away from the manhole openings.

3.1.11.2.5. Because inlet and outlet pipe slopes are critical, the location of the exterior grease trap tank shall require prior approval of the Village Engineer for location and grades. For projects requiring prior Site Plan Approval requirements, this site element shall be included on the Site Plan Submittal(s).

3.1.12. LIFT STATIONS

3.1.12.1. Consult with ~~Village Engineer Engineering Services Division~~ and the Wastewater Utility for design requirements.

3.1.13. INSULATION

3.1.13.1. MATERIALS

3.1.13.1.1. Minimum of 2" thick Styrofoam plastic foam boards as manufactured by:

- A. Upjohn; or
- B. Dow Chemical Company, or
- C. Pre-approved equal.

3.1.13.2. DESIGN STANDARDS

3.1.13.2.1. All sanitary sewer pipes (mains, force mains & laterals), having less than 5.0 ft. of cover material, shall be insulated.

3.2. ABANDONMENT

3.2.1. GENERAL

3.2.1.1. All existing sanitary sewer mains and service lines, that will not be used in new or re-used in reconstruction of existing building sites, shall be abandoned at the main.

3.2.1.2. Abandonment shall be witnessed by the Village Inspector or a Utility Representative.

3.2.1.3. Main and/or service abandonment at the street main shall be a condition of any site demolition permit(s) issued or in the case of duplication, service lines that will remain unused on new construction.

3.2.1.4. All excavations within public rights-of-way shall require Village and/or County Permits.

- 3.2.1.5. Excavations within 5 ft. of and under paved surfaces shall be backfilled with Slurry Aggregate per the SWS to within 1.5 ft. of surface, followed by appropriate street restoration and not less than 3-inch of binder and 2-inch of wearing surface bituminous pavements.
- 3.2.1.6. In special circumstances, when approved in writing by the Village Engineer and the Utility **Superintendent**, sanitary sewer service lines may be temporarily made inactive at the right-of-way or easement boundary. Sanitary sewer lines shall be plugged or capped to be made watertight at the property line. Sewer service lines not abandoned at the main shall meet the following conditions:
- 3.2.1.6.1. As part of the demolition permit, a certified check or Letter of Credit, in the amount of \$5,000 per lateral, shall be submitted to the Village Engineer to guarantee the permanent abandonment of the service at the main is completed in a timely manner.
- 3.2.1.6.2. Any service line that is not abandoned at the main shall be subject to separate "availability" or "ready to serve" charges in the interim period until properly abandoned.
- 3.2.1.6.3. Sanitary lines made inactive in this manner shall be marked with a marker post placed 1 ft. from the end of the pipe and extending from the pipe to 3 ft. above the ground surface and painted a brilliant green color.
- 3.2.1.6.4. The location of the terminal pipe locations shall be surveyed or otherwise "tied" to permanent objects that will remain undisturbed at the site, with an as-built drawing provided to the Village Engineer and **Wastewater Utility Utility Department** for record purposes.

3.2.2. SANITARY SEWER

- 3.2.2.1. All sanitary lines shall be abandoned at the street main fitting by disconnecting and removing 2 - 3 ft. of pipe and installing a water-tight cap or plug at the main fitting and on the abandoned line.
- 3.2.2.1.1. For Poly Vinyl Chloride (PVC) gasketed fittings, a Spigot Plug shall be installed.
- 3.2.2.1.2. A cured in-place plug will be allowed to abandon services deemed by the Utility to be 100% effective.
- 3.2.2.1.3. For PVC solvent weld or glued joint fittings, a gasketed Cap shall be installed on an undisturbed and undamaged max. 1.0 ft. spool piece.
- 3.2.2.1.4. For Concrete, Vitrified Clay, ABS/Truss, DIP or CIP (NOT soil pipe), a PVC Spigot Plug shall be installed using the appropriate Fernco **Strong Back** coupling onto an undisturbed and undamaged max. 1.0 ft. spool piece.
- 3.2.2.1.5. All Cast Iron Soil Pipe shall be removed and ONE of the above procedures used.
- 3.2.2.1.6. If connection to the main is via a "break-in", then an appropriate length of main shall be cut and removed, with an identical length of PVC SDR 35 or 28 installed using appropriate couplings.
- 3.2.2.1.7. "Buffalo type" saddles are not acceptable for concrete and PVC pipe materials. Use of solvent weld or glued caps or plugs will not be acceptable.
- 3.2.2.2. Sanitary or other special manholes or structures that are part of an abandoned system shall also be abandoned by removing the casting, chimney and cone or corbel sections, followed by plugging the outlet and inlet pipe(s) with non-shrink cementitious grout.
- 3.2.2.3. The manhole barrel shall be filled with crushed stone compacted to 95% minimum standard Proctor density.

3.2.2.4. The property owner shall be responsible for proper disposal of all manhole components removed. All waste materials shall be removed from pipelines and structures before abandonment.

3.3. INSPECTION

When starting an installation, the farthest downstream location of the new sanitary sewer system shall have a plug installed and maintained by the utility Contractor. That plug shall not be removed until the system has been accepted by the ~~Wastewater Utility Village Engineer~~ and deemed operational by the Village and/or the Utility Department.

3.3.1. SUBMITTALS AND SAMPLES

3.3.1.1. All materials of each type or use shall be from a single manufacturer. Contractor shall submit for approval six (6) sets of material specifications, certification and testing results by manufacturer on EACH material item required on the Project.

3.3.2. ACCEPTANCE TESTING

3.3.2.1. General

3.3.2.1.1. Deflection and Leakage tests in accordance with SWS and under supervision of the Engineering Project Inspector and the Wastewater Utility.

3.3.2.1.2. All sewer pipes shall be laid uniformly to line and grade. Noticeable variation from true alignment and grade will be considered to be sufficient cause for rejection of the work by the Village. Care should be taken to ensure that the entering pipe is forced tightly against the last pipe laid.

3.3.2.1.3. Sanitary main and lateral alignment shall be uniform in line and grade as measured from the inlet to the outlet of the pipe section. Vertical misalignment of greater than $\frac{3}{4}$ " in a single pipe section or a sag in the pipe grade extending for more (longer) than one-and-one-half (1.5) sections of pipe shall be cause for rejection. Any correction by the Contractor shall be at no cost to the Village or Utility.

3.3.2.1.4. Two (2) business days' notice is required to be given to the Village's Inspector and the Wastewater Utility.

3.3.2.1.5. All water that is used for construction purposes will be charged at the current rates for such use. A PERMIT IS REQUIRED FROM THE WATER UTILITY PRIOR TO ANY WATER USE.

3.3.2.2. Tests

3.3.2.2.1. Deflection testing for flexible mains shall be at the 95% of specified minimum I.D.

Leakage testing shall include all installed system components, such as mains, branches, laterals, risers and taps to the terminus of lines installed. For each foot that the test section is below ground water level, the test pressure shall be increased by 0.43 PSI for each foot that the average ground water height for the test section is above the spring line. In absence of recorded data on ground water table above pipe invert, it shall be assumed to begin at six (6) feet below finished manhole grade. Therefore, the minimum increase in test pressure shall be 6.6 psi and the maximum test pressure shall be 10.0 psi.

3.3.2.2.2. Sanitary Manholes shall be vacuum tested for leakage in accordance with standard test methods outlined in ASTM C-1244-93 or current edition, and minimum test time periods of:

42" & 48" dia. Manholes	60 sec.
60" dia. Manholes	75 sec.
72" dia. & greater Manholes	90 sec.

- 3.3.2.2.3. Interior manhole walls to be vacuum tested shall be dry. As required by MMSD, sanitary manholes shall be vacuum tested from the lid down to the invert. If a vacuum test fails, all remedial sealing is to be done on the exterior of the manhole prior to re-testing following proper curing time. Manholes receiving repairs shall be vacuum tested again after repairs are completed.
- 3.3.2.2.4. As an alternative, sanitary manholes may be vacuum tested from the top of the cone to the invert provided that the frame/cone internal seal and extension, if installed, are water tested during installation as required by MMSD. Reports summarizing the vacuum testing shall be submitted to the Utility Department.
- 3.3.2.2.5. Follow hydrostatic testing procedures outlined in SWS, Section 4.15, at 100 psi and no leakage.
- 3.3.2.2.6. Testing of both internal and external seals shall be with a gallon of dyed water behind the seal for a period of 1 minute without any leakage through the bottom clamp.
- 3.3.2.2.7. Prior to pre-punch list work, tracer wires shall be tested by Contractor prior to Village accepting the work. The Utilities Department has the option to spot check the continuity of the tracer wires.
- 3.3.2.2.8. As part of the pre-punch list work, Contractor required to notify when CCTV is ready to start. CCTV will be completed by the Village Wastewater Utility at no cost to Contractor.

3.3.3. CLEANING

3.3.3.1. Cleaning Precautions

- 3.3.3.1.1. During the cleaning process, **a mechanical plug of appropriate size will be installed at the furthest downstream manhole**, and all efforts shall be made to keep foreign materials and water from adjoining sewer systems.
- 3.3.3.1.2. Contractor shall clean all sanitary sewer line sections between manholes using high-velocity jet, or mechanically powered equipment. All dirt, sand, rocks, and other solid or semi-solid material resulting from the construction of the system shall be removed before acceptance.
- 3.3.3.2. Contractor shall be required to repair all visible damage and leaks in the mains.
- 3.3.3.3. This procedure is in addition to any testing required by SWS and/or MMSD.
- 3.3.3.4. Acceptance of sewer line cleaning and construction will be made upon the successful completion of the CCTV inspection **by the Village**, and to the satisfaction of the **Wastewater Utility Department**. If the CCTV inspection shows the cleaning to be unsatisfactory, the Contractor shall be required to re-clean and re-inspect the sewer line until the cleaning is shown to be satisfactory. Second inspection by CCTV due to dirt in pipe will be charged to Contractor.

3.3.4. CCTV – Private Interceptor Sewers

- 3.3.4.1. Contractor **will perform CCTV after construction is complete. has the option to contract directly with the Utility Department for performing CCTV inspection.** A copy of the CCTV video and report shall be provided to the Wastewater Utility.
- 3.3.4.2. Color videotape recordings of the data shall be made by the Contractor. Copies of each videotape, in USB digital format (USB flashdrives) or approved media, shall be provided to the Wastewater Utility. PipeTech Compatible P.A.C.P. codes are required.
- 3.3.4.3. A set of system map Plan Sheets shall be included with all CCTV report books.

TABLE OF CONTENTS

4 STORM SYSTEM	65
4.1 SPECIFICATIONS	65
4.1.1 STORM SEWER PIPE	66
4.1.2 STORM LATERALS (From main to lot line)	66
4.1.3 CULVERTS	68
4.1.4 FLARED END SECTIONS	69
4.1.5 DITCHES	70
4.1.6 STORM MANHOLE & JUNCTION CHAMBERS	70
4.1.7 CATCH BASINS	72
4.1.8 FIELD INLETS	72
4.1.9 ROAD UNDERDRAINS	73
4.1.10 BEHIND CURB COLLECTORS	74
4.1.11 FRAMES, GRATES AND LIDS	75
4.1.12 FRAME ADJUSTMENTS	76
4.1.13 SUMP PUMPS, DOWN SPOUTS, AND ROOF DRAINS	76
4.1.14 BEDDING/COVER/BACKFILL	77
4.1.15 PIPE TO MANHOLE CONNECTIONS	79
4.2 INSPECTION	77
4.2.1 SUBMITTALS AND SAMPLES	77
4.2.2 ACCEPTANCE TESTING	77

4. STORM SYSTEM

4.1. SPECIFICATIONS

All labor and material provided under this contract shall be governed by the latest edition and all amendments thereto of the Standard Specifications for Sewer and Water Construction in Wisconsin (SWS) and State of Wisconsin Department of Transportation Standard Specifications for Road and Bridge Construction, unless otherwise specified in these Specifications, whichever is more restrictive. A full-time inspector is required to be at the project site to observe pipe unloading, inspect construction materials, and observe and document the construction of storm sewers and laterals. THESE STANDARDS SHALL APPLY TO ALL PUBLIC STORM SEWERS. Any and all modifications to these Specifications shall be approved by the Village Engineer.

Design shall follow SWS Specifications, Milwaukee Metropolitan Sewerage District (MMSD) Rules, Village of Germantown Municipal Code Chapter 27 and be designed in accordance with the NOAA Atlas 14. For private property in new development, if Department of Commerce procedures are used, the designer shall verify that off-site flows meet all of the requirements of the Rational Method or TR-55 Method. Design shall also conform to the following:

4.1.1. STORM SEWER PIPE

4.1.1.1. MATERIALS

4.1.1.1.1. All storm sewers shall be constructed with a minimum Class III reinforced concrete pipe per SWS, Section 8.6.0 or as approved by Village Engineer:

A. Reinforced Concrete Pipe – ASTM C76

B. Horizontal Elliptical Reinforced Concrete Pipe – ASTM C507.

C. Joints for concrete storm sewer pipe shall have rubber gaskets conforming to SWS, Section 8.41.2.

4.1.1.2. DESIGN STANDARDS

4.1.1.2.1. Minimum size: 12"

4.1.1.2.2. Location:

A. In streets and easements: 10 feet west or south of the sanitary sewer.

4.1.1.2.3. Pipe cover:

A. 3 feet minimum from finish design grade to outside top of storm sewer.

4.1.1.2.4. Storm sewers with diameters greater than 24" equivalent, daylighting in ditches shall have safety grates, meeting design standards, installed at the upstream and downstream ends.

4.1.1.2.5. Mainline and conveyance storm sewer design storm: 25-yr.; Storm sewers may not be surcharged in a 25-yr. or less design storm condition. Surge condition is defined as to the crown of pipe (full pipe flow - no pressure).

4.1.1.2.6. Minimum slope shall be 0.2% and achieve minimum velocity = 2.0 feet per second when pipe is flowing half-full. Village Engineer may waive the 0.2% minimum slope for runs of pipe longer than 400 feet. Village Engineer may limit maximum velocities.

4.1.1.2.7. Complete sewer design calculations are required with submittals, including Drainage Areas Map.

4.1.1.2.8. Storm sewer shall be required in public Rights-of-Way in new developments where the depth of proposed ditches exceed 3 feet as measured from the edge of pavement.

4.1.2. STORM LATERALS (From main to lot line)

4.1.2.1. MATERIALS

4.1.2.1.1. Unless otherwise specified, all pipe used for storm laterals shall be:

A. Class III concrete sewer pipe; or

B. PVC (SDR 26) pipe

4.1.2.2. DESIGN STANDARDS

4.1.2.2.1. Minimum size in ROW/easement areas shall be 6" diameter.

4.1.2.2.2. The minimum slope on laterals shall be 1/8" per foot.

4.1.2.2.3. The maximum slope on laterals shall be 1/2" per foot.

4.1.2.2.4. Minimum cover for storm sewer laterals in paved areas shall be 12" as measured from the top of the pipe to the top of the subgrade.

4.1.2.2.5. A clay dam across the trench shall be constructed adjacent to pavement low points with all storm sewer laterals.

4.1.2.2.6. Connection of laterals to storm sewer shall be subject to following:

- A. Location of invert of new lateral may be permitted a maximum of 12" above spring line of outlet sewer or use outside drop inlet per SWS for main sewers.
- B. Hole - Core drill only. Deliver "cut-out" to the Construction Inspector.
- C. Connection Device - Kor-N-Seal boot, or pre-approved equal with stainless steel snap-in ring.
- D. Any lateral that is connected into a manhole shall have a smooth concrete bench/channel placed to convey lateral flow into the storm sewer.
- 4.1.2.2.7. Storm sewer lateral lines shall be designed to receive the storm water runoff from window wells, footing drains and sump pumps.
- 4.1.2.2.8. In areas with storm sewer, a storm sewer lateral shall be provided for each lot or building. The Village Engineer may waive this requirement for lots that are adjacent to and drain to adjacent public drainage easements, wetlands or waters of the State.
- 4.1.2.2.9. Sump discharges for all buildings shall be located at the front of building (facing street). Village Engineer may waive this requirement for lots that are adjacent to and drain directly to public drainage easements, wetlands or waters of the State.
- 4.1.2.2.10. Storm laterals shall be located to the right of sanitary sewer lateral when looking from the street.
- 4.1.2.2.11. Covers installed on lateral cleanouts shall not be bolted to the cleanout pipe.

4.1.3. CULVERTS

4.1.3.1. MATERIALS

- 4.1.3.1.1. Culverts shall be manufactured and installed in accordance with the requirements of the Standard Specifications for Highway and Bridge Construction in Wisconsin.
- 4.1.3.1.2. Damaged or rusted culvert pipes shall not be reused.

4.1.3.2. DESIGN STANDARDS

- 4.1.3.2.1. Culverts located in a Primary Storm Water Management System (PSMS) shall provide at least the 100-year level of protection for capacity and road overtopping.
- 4.1.3.2.2. Culverts located in a minor storm water management system shall be designed to safely convey surface water runoff from a 10-year storm event. Culverts may not be surcharged in a 10-year or less design storm condition. Surge condition is defined as to the crown of pipe (full pipe flow – no pressure).
- 4.1.3.2.3. Minimum size shall be 12" diameter for driveways and 15" for roadway cross culverts.
- 4.1.3.2.4. Minimum culvert lengths:

< 24" diameter	20 feet
24" – 30" diameter	22 feet
36" – 42" diameter	24 feet
48" and larger diameters	26 feet

- 4.1.3.2.5. Culverts less than 24 feet in length shall consist of one piece of pipe.
- 4.1.3.2.6. All crossroad culverts shall be designed to provide a minimum of 12" of cover to the top of the pipe at the edge of the finished pavement of the road.

4.1.4. FLARED END SECTIONS

4.1.4.1. MATERIALS

4.1.4.1.1. The end sections shall be manufactured and installed in accordance with the requirements of the WisDOT Standard Specifications, Section 521 or Section 522 as applicable.

4.1.4.2. DESIGN STANDARDS

4.1.4.2.1. In areas with greater than 35 miles per hour, flared end sections shall be required to be installed on the ends of driveway culvert.

4.1.5. DITCHES

4.1.5.1. DESIGN STANDARDS

4.1.5.1.1. Slopes.

4.1.5.1.2. Grassed Invert

- A. 1½% minimum
- B. 4% maximum

4.1.5.1.3. Concrete Invert:

- A. Greater than 4% or less than 1½%.
- B. 10 % maximum, 0.7% minimum.
- C. Invert shall be placed on a minimum of 3" of crushed aggregate base course.
- D. Place sod within the initial 1½ feet of ditch side slopes adjacent to the concrete invert.
- E. 2-ft. minimum width, v-bottom
- F. V-bottom formed by 4H:1V sloped top surface
- G. Minimum concrete thickness: 6"

4.1.5.1.4. Alternative methods may be used after approval of the Village Engineer is obtained.

4.1.5.1.5. Fore slope: 4H:1V maximum.

4.1.5.1.6. Backslope: 4H:1V maximum.

4.1.5.1.7. The minimum ditch depth shall be 12" below the shoulder point at roadway high points. Other ditch locations shall have a minimum depth of 20" below the shoulder point and be graded to accommodate a properly sized driveway culvert.

4.1.5.1.8. Adopt and administer the WDNR Technical Standards 1053, 1058, and 1059 for erosion control. All roadside ditches shall be covered with a minimum of 4" of topsoil, and either seeded, fertilized and matted or sodded. Sod placement shall be required on longitudinal slopes greater than 4%

4.1.5.1.9. If the back slope of a ditch extends beyond the right-of-way, drainage easements shall be required adjacent to the street right-of-way at a uniform distance from the road centerline or pipe to be buried within right-of-way as to avoid encroaching on private property, as approved by the Village Engineer.

4.1.5.1.10. Turf reinforcement may be used as a substitute for concrete invert in ditches with slopes between 4% - 5%. Village Engineer shall pre-approve turf reinforcement type.

4.1.6. STORM MANHOLE & JUNCTION CHAMBERS

4.1.6.1. MATERIALS

4.1.6.1.1. All storm manholes shall be pre-cast concrete with integral base, with pre-cast flattops (slab or deck) with an opening for the casting.

4.1.6.1.2. The manholes shall be sized as follows:

Downstream Pipe O.D.*	Minimum Manhole I.D.
27" or less	42"
28" – 30"	48"

31" – 36"	60"
37" – 42"	72"
>42"	Special Design Requiring Village Engineer Approval
*O.D. is the largest horizontal outside pipe dimension	

4.1.6.1.3. Where field conditions allow, the manhole shall be constructed with an offset cone.

4.1.6.1.4. All chimney joints, including the frame-chimney joint, and all barrel & cone section lifting holes shall be sealed with a cementitious grout with a struck joint. Grout shall be premixed, non-metallic, high-strength, non-shrink, Pennegrout. by IPA Systems, or approved equal, which meets requirements of ASTM C-1-91 and C-827 as well as CRD C-588 and C-621. When mixed to a mortar or "plastic" consistency, the grout shall have a minimum 1-day and 28-day compressive strength of 6,000 and 9,000 psi, respectively. Dry stacking of riser rings or flat decks shall not be permitted. They shall be laid in a bed of grout as described above.

4.1.6.1.5. Steps meeting the requirements of SWS, Section 6.40.1 shall be installed in all manholes or junction chambers deeper than 4', from floor to rim.

4.1.6.1.6. Drop pipes or other energy-dissipating structures shall be provided for all sewers entering a manhole with their invert at an elevation more than 24" above the invert of the sewer leaving the manhole.

4.1.7. CATCH BASINS

4.1.7.1. MATERIALS

4.1.7.1.1. Shall consist of masonry, pre-cast or monolithic construction in accordance with Chapter 3.6.1 and File No. 25 or 26 of SWS. All catch basins shall be designed and constructed to allow easy access for maintenance and cleaning.

4.1.7.1.2. Steps meeting the requirements of SWS shall be installed in all catch basins deeper than 4', from floor to rim.

4.1.7.1.3. Size (minimum).

A. For mountable curb, use Neenah castings 3501 Rectangular 24" x 30" (Internal Dimensions).

B. For vertical face curb, use Neenah casting 3228 Rectangular 24" x 36" (Internal Dimensions).

C. Round 48" ID.

D. Manhole inlets - Allowed only in cases where an angle point in the storm sewer occurs under the curb line. (These shall be avoided whenever possible.)

4.1.7.1.4. A continuous 4" diameter perforated, corrugated polyethylene drainpipe, meeting the requirements of AASHTO Designation: M-252, shall be installed under the curb and gutters and extend 50 feet in either direction from storm water catch basins located at low points. For catch basins in other locations, the 50-ft length of drainage pipe shall be connected only to the upstream side.

4.1.7.1.5. Where underdrain pipe is specified, a 4" diameter hole shall be cored in opposite sides of each catch basin located at low points to allow the connection of 4" diameter perforated, corrugated polyethylene underdrain pipe. Catch basins located in other locations shall have a 4" diameter hole cored in the upstream side to allow the connection of 4" diameter underdrain pipe. The holes shall be cored at an elevation that is below the subgrade elevation to allow for positive drainage and proper placement of the underdrain. Village Engineer may waive underdrain requirement.

4.1.7.1.6. All chimney joints, including the frame-chimney joint, and all barrel & cone section lifting holes shall be sealed with a cementitious grout bed with a struck joint. Grout shall be premixed, non-metallic, high-strength, non-shrink, Pennegrout. by IPA Systems, or approved equal, which meets requirements of ASTM C-1-91 and C-827 as well as CRD C-588 and C-621. When mixed to a mortar or "plastic" consistency, the grout shall have a minimum 1-day and 28-day compressive strength of 6,000 and 9,000 psi, respectively.

4.1.7.2. DESIGN STANDARDS

4.1.7.2.1. Inlet capacity design storm: 25-yr. storm event. In a 25-yr. storm event, the maximum spread of ponded storm water shall be 8 feet as measured from the face of curb.

4.1.7.2.2. Inlet capacity design storm: 50-yr. storm event for areas with no overland flow relief. In roadways, storm water ponding shall not exceed 6" on paved parking areas and 4" at the centerline in a 100-yr. storm event.

4.1.7.2.3. At low points, curb pan shall be pitched a ½ inch five feet on both sides of catch basins.

4.1.7.2.4. Where only front yard drainage flows to the curb, maximum separation or run to a catch basin is 300 feet unless in the opinion of the Village Engineer a lesser distance is required. Where the collective drainage from more than one lot discharges over the curb at a single point, a catch basin shall be required at the lot line extended

4.1.8. FIELD INLETS

4.1.8.1. MATERIALS

Shall consist of masonry, pre-cast or monolithic construction in accordance with Chapter 3.6.3 and File No. 28 or 29 of SWS.

4.1.8.1.1. Inlets shall be designed and constructed to allow easy access for maintenance and cleaning.

4.1.8.1.2. All chimney joints, including the frame-chimney joint, and all barrel & cone section lifting holes shall be sealed with a cementitious grout bed with a struck joint. Grout shall be premixed, non-metallic, high-strength, non-shrink, Pennegrout. by IPA Systems, or approved equal, which meets requirements of ASTM C-1-91 and C-827 as well as CRD C-588 and C-621. When mixed to a mortar or "plastic" consistency, the grout shall have a minimum 1-day and 28-day compressive strength of 6,000 and 9,000 psi, respectively.

4.1.8.2. DESIGN STANDARDS

4.1.8.2.1. Inlet capacity design storm: 25-yr. storm event. In a 25-yr. storm event, the maximum spread of ponded storm water shall be 8 feet as measured from the face of curb.

Inlet capacity design storm: 50-yr. storm event for areas with no overland flow relief. In roadways, storm water ponding shall not exceed 6" on paved parking areas and 4" at the centerline in a 100-yr. storm event.

4.1.9. ROAD UNDERDRAINS

4.1.9.1. MATERIALS

4.1.9.1.1. Underdrain systems shall be installed under curb and gutters to collect water and convey it to catch basins.

4.1.9.1.2. The underdrain system shall be constructed with:

A. 4" diameter perforated, corrugated polyethylene drainage pipe meeting the requirements of AASHTO Designation: M-252.

B. Pipe perforations may be holes or slots and may be in 3 or 4 lines spaced around the circumference of the pipe at 120° or 90° respectively.

4.1.9.1.3. The trench shall be backfilled with open graded $\frac{3}{4}$ " crushed stone.

4.1.9.1.4. Geotextile fabric, as specified in Section 612.2.8 of the Standard Specifications, shall be used to line the underdrain trench before the drainage pipe is installed and backfilled. Enough fabric shall be provided as to cover the sides and bottom of the trench and overlap across the top of the trench by a minimum of 4 inches.

4.1.9.2. DESIGN STANDARDS

4.1.9.2.1. The 4" drainage pipe shall be laid in an 8" deep by 8" wide trench with flat bottom with square sides as shown in the Figure 7 of the Details. The trench, constructed at an elevation lower than the base course, shall extend 50 feet in either direction from a storm water catch basin located at the low point of the road, aligned with the proposed centerline of the flange of the curb and gutter. For catch basins in other locations, the 50' drainage pipe shall be connected only to the upstream side.

4.1.9.2.2. The drainage pipe shall be connected to catch basins in cored holes and grouted in-place in the cored holes. The end of drainage pipe opposite the catch basin shall be capped with a cap suitable for installing on the drainage pipe.

4.1.10. BEHIND CURB COLLECTORS

4.1.10.1. MATERIALS

4.1.10.1.1. All behind the curb collector systems shall be constructed with minimum 6" diameter PVC (SDR 35) pipe.

4.1.10.1.2. The clean out shall consist of a standard pre-cast 24" x 36" box inlet with a Neenah R-1878-B7L frame and lid as shown in Figure 15 of the Details.

4.1.10.2. DESIGN STANDARDS

4.1.10.2.1. Connected to sump pump drainage lines in lieu of storm sewer.

- A. 36" from flow line to surface.
- B. 1 % minimum grade.
- C. 300-ft. maximum run to outlet.
- D. Maximum run of 250 feet in curvilinear street.
- E. Maximum of 4 lots contributing area.

4.1.10.2.2. Behind the curb collector systems shall be installed 2' behind the curb at cul-de-sacs and hill crests where storm sewers are not located.

4.1.10.2.3. The collector pipe shall be connected to the nearest catch basin.

4.1.10.2.4. A clean out shall be installed at the upstream end of the collector system.

4.1.10.2.5. Sump lines for lots not served by the storm sewer shall be connected to the PVC collector pipe by a wye or tee fitting.

4.1.10.2.6. Tracer wire installation is required on all behind the curb collector pipe.

4.1.11. FRAMES, GRATES AND LIDS

4.1.11.1. MATERIALS

4.1.11.1.1. Vertical curb catch basin frames and grates shall be

- A. Neenah R-3228-K, (with Rectangular 24" x 36" structure).
- B. or equal as pre-approved by the Village Engineer.
- C. Driveway frame and grate shall be 3290-A.

4.1.11.1.2. Mountable curb catch basin frames and grates shall be:

- A. Neenah R-3501-R, (with Rectangular 24" x 30" structure).

B. or equal as pre-approved by the Village Engineer. (Add a flat frame and grate for driveway curb head reductions)

4.1.11.1.3. Field inlet frames and grates shall be:

A. Neenah R-3210-A, (with 35" x 35" structure).

B. or equal as pre-approved by the Village Engineer.

C. A Neenah ~~R-2560-E1~~ or **R-2561** series beehive frame and grate shall be used where required by the Village (with 30" OD structure).

4.1.11.1.4. Manhole frames and grates in field inlet applications shall be:

A. Neenah R-2577-1, or

B. equal as pre-approved by the Village Engineer.

4.1.11.1.5. Manhole frames and lids in pavement applications shall be:

A. Neenah R-1661, or

B. equal as pre-approved by the Village Engineer.

4.1.11.1.6. Covers shall have machined bearing surface and will be permitted to have eight (8) vent holes.

4.1.11.1.7. A pipe grate with maximum opening size of 6" shall be installed on storm sewer inlets 18" or larger. Grate shall be hot-dipped galvanized after fabrication or be constructed of corrosion resistant material approved by Village Engineer.

4.1.12. FRAME ADJUSTMENTS

4.1.12.1. MATERIALS

4.1.12.1.1. All frame/casting adjusting rings for manholes, catch basins and inlets shall be:

~~A. Reinforced concrete rings having 26-inch I.D., or~~

B. Pro-Ring™ by Cretex, or

C. approved equal

4.1.12.1.2. The minimum for a chimney section shall be the height associated with the proper placement of one 2" adjusting ring. The maximum height of adjusting rings above the cone or slab top is 16 inches as measured from the top of cone or slab top. If more than 16 inches of adjusting rings are needed to set the casting to finished grade, then an additional barrel section shall be installed on the manhole.

4.1.12.1.3. The minimum thickness of individual pre-cast concrete adjusting rings shall be a nominal 2". The maximum thickness shall be a nominal 4".

4.1.13. SUMP PUMPS, DOWN SPOUTS, AND ROOF DRAINS

4.1.13.1. DESIGN STANDARDS

4.1.13.1.1. Sump pumps shall be connected to a storm sewer system if one exists adjacent to the lot.

4.1.13.1.2. Down spouts and roof drains, if not buried, may be connected to a sump collector. If buried, they shall be connected to sump collector.

4.1.13.1.3. If storm sewer is not provided or if a rural roadway section exists, then sump pumps shall be installed to receive and discharge ground water from footing drains.

4.1.13.1.4. Sump pumps, down spouts and roof drains shall discharge on the ground to the front of the lot so that:

A. Adjoining properties are not adversely affected.

B. If no drainage easement exists along a side or rear lot line, the discharge point within the site, shall be at least 10' from the lot line.

- C. If a public open drainage easement exists adjacent to any lot, the discharge point for down spouts and/or roof drains shall be discharged directly into the easement.

4.1.14. BEDDING/COVER/BACKFILL

4.1.14.1. MATERIALS

4.1.14.1.1. Pipe Bedding/Cover: In accordance with SWS as follows -

- A. Flexible wall pipe shall be Class "B" up to 12" above the top of pipe; 3/8" limestone chips.
- B. Rigid wall pipe with diameters equal to or less than 21" shall have 3/8" limestone chips up to 6" above the top of pipe.
- C. Rigid wall pipe with diameters greater than 21" shall have ¾" limestone chips up to 6" above the top of pipe.

4.1.14.1.2. Cover Material: In accordance with SWS, Section 8.43.3. No stone, rock or other similar material with a sieve size greater than 1" shall be permitted.

4.1.14.1.3. Granular Backfill: In accordance with SWS, Section 8.43.4. No stone, rock or other similar material with a sieve size greater than 3" shall be permitted. Granular material shall be crushed limestone.

4.1.14.1.4. Spoil Backfill: In accordance with SWS, Section 8.43.5. No stone, rock or other similar material with a sieve size greater than 3-inches shall be permitted. In areas where excavated material(s) are determined to be not acceptable, in the judgement of the Village Engineer, then imported backfill material meeting the requirements of SWS will be required.

4.1.14.1.5. Slurry Backfill: Aggregate slurry in accordance with SWS, Section 8.43.8 and requirements of the Village Engineer, or in accordance with street opening permit, when issued. In special cases, the Village Engineer may direct the use of Sand Slurry consisting of 50 pounds of fly ash and a ½ bag of Portland cement per cubic yard of mix.

4.1.14.2. DESIGN STANDARDS

4.1.14.2.1. Backfill in accordance with all street opening permit(s), generally this will be aggregate slurry. All areas greater than 5 ft from a paved surface (and above a 45-degree intercept line) may receive suitable spoil backfill as provided herein.

4.1.14.3. INSTALLATION

4.1.14.3.1. Care shall be taken by the Contractor when backfilling to prevent any movement of the pipe from proper alignment and grade. Contractor is responsible for determining that the finished sewer remains at the required elevation and grade.

4.1.14.3.2. Mechanically compact all trench backfill per SWS, Section 2.614(b). The initial lift to be compacted shall have a 2' loose thickness. Each subsequent lift to be compacted shall have a maximum 18" loose thickness. Contractor shall place thinner lifts if the required compaction cannot be achieved.

4.1.15. PIPE TO MANHOLE CONNECTIONS

4.1.15.1. MATERIALS

4.1.15.1.1. In accordance with SWS, Section 3.5.7, except as modified below:

4.1.15.1.2. Amend the last sentence of Section 3.5.7(a) by adding the following: "using boots or cast-in-place cementitious material."

4.1.15.1.3. Delete the last paragraph of Section 3.5.7 (c) & replace with: "To maintain seal flexibility, the annular space between the pipe and manhole wall shall be plugged with flexible butyl rubber gasket material prior to pouring the manhole invert and bench in accordance with

SWS, Section 6.41.6. When connecting pipe to existing pre-cast concrete manholes, core hole in manhole wall prior to installing pipe to manhole seal."

4.2. INSPECTION

4.2.1. SUBMITTALS AND SAMPLES

4.2.1.1. All materials and installations shall conform to SWS and are subject to the Village Engineer's approval. All materials of each type or use shall be from a single manufacturer. Contractor shall submit for approval six (6) sets of material specifications, certification and testing results by manufacturer on EACH material item required on the Project.

4.2.2. ACCEPTANCE TESTING

4.2.2.1. General

4.2.2.1.1. Installation shall be in accordance with SWS, and these specifications.

4.2.2.1.2. All storm sewer pipe shall be laid uniformly to line and grade. Noticeable variation from true alignment and grade will be considered, by the Village, sufficient cause for rejection of the work. Care should be taken to ensure that the entering pipe is forced tightly against the last pipe laid.

4.2.2.1.3. Storm sewer, storm sewer inlets, storm sewer catch basins, and lateral alignment shall be uniform in line and grade as measured from the inlet to the outlet of the pipe section. Vertical misalignment of greater than $\frac{3}{4}$ " in a single pipe section or a crest in the pipe grade extending for more (longer) than one-and-one-half (1-1/2) sections of pipe shall be cause for rejection and correction by the Contractor at no cost to the Village.

4.2.2.1.4. Manhole barrel joint(s) gasket material ("E-Z-Stik") shall be placed on the vertical slope of each joint and shall be of the size necessary to fill the annular space of the joint. Lifting holes shall be grouted with Pennegrout and struck smooth on the interior and exterior surfaces. Chimney joints shall be grouted with Pennegrout. The grout shall extend the full width of each grade ring and each joint shall be struck-off vertically, even with the inside and outside chimney surfaces.

4.2.2.1.5. Rim elevations for manholes located in paved areas shall be set $\frac{3}{8}$ " – $\frac{1}{2}$ " below the asphalt binder grade elevation. Ramping of manholes will not be allowed.

4.2.2.1.6. Final adjustments to raise rim elevations to $\frac{1}{2}$ " below the grades shown on the final paving plans shall be made by installing adjusting rings as needed just prior to placement of the final lift of the pavement (surface course).

4.2.2.1.7. Catch basins shall be initially constructed to approximate $\frac{3}{4}$ " below binder grade prior to the curb and gutter construction. When curb and gutter is constructed, the concrete curb and gutter shall be stopped 5 feet on either side of the inlet. At intersections, catch basins are to be constructed 5 feet from the end of radii (to side of inlet). Temporary curb and gutter in the 5-foot gap on either side of the inlet shall be constructed with asphalt transitioning from the final grades of the concrete curb and gutter to the grade of the grate set at binder grade.

4.2.2.1.8. At the time of placement of the final surface course of pavement, the temporary asphaltic curb and gutter shall be removed, and the inlet frame shall be set to final grade by adding one 2" adjusting ring and applying Type "M" mortar per SWS, Section 6.37.1. The concrete curb and gutter shall be completed. No wood shims shall be left in place. With this method, tuck pointing beneath the frame should not be required.

4.2.2.1.9. Any catch basin out of horizontal alignment by more than 2 inches shall be reconstructed to match the curb and gutter.

- 4.2.2.1.10. Contractor shall furnish and place a temporary 2" x 6" stake at the end of each storm lateral.
- 4.2.2.1.11. Existing field tiles shall be connected to a storm sewer or have a positive outfall provided.
- 4.2.2.1.12. All storm sewers shall be free from debris, sedimentation, or garbage prior to Village acceptance.
- 4.2.2.1.13. Downspout cleanouts and catch basins shall be inspected by the Village prior to acceptance by the Village.

TABLE OF CONTENTS

5 ROAD SYSTEM	82
5.1 GEOMETRICS	82
5.1.1 RIGHT-OF-WAY WIDTHS	82
5.1.2 PAVEMENT WIDTHS	82
5.1.3 BOULEVARD SECTIONS	82
5.1.4 CUL-DE-SACS	83
5.1.5 CLOSE/LOOP STREET	83
5.1.6 STREET GRADES.....	84
5.1.7 CROSS SLOPE	84
5.1.8 HORIZONTAL CURVES	84
5.1.9 VERTICAL CURVES	84
5.1.10 SIGHT DISTANCE	84
5.1.11 INTERSECTION RADII	85
5.1.12 ACCELERATION/DECELERATIONS/BYPASS LANES	85
5.1.13 TRANSITIONS	85
5.2 SPECIFICATIONS	85
5.2.1 SUBGRADE	85
5.2.2 GEOTEXTILE FABRIC	86
5.2.3 BASE COURSE	87
5.2.4 FROST BARRIER	88
5.2.5 SHOULDERS	88
5.2.6 ASPHALT PAVEMENT	88
5.2.7 CONCRETE PAVEMENT	90
5.2.8 ADMIXTURES	92
5.2.9 CURB AND GUTTER	92
5.2.10 ROAD UNDERDRAIN PIPE	94
5.2.11 DRIVEWAYS	94

5.2.12 PARKING LOTS	96
5.2.13 SIDEPATHS AND TRAILS	97
5.2.14 STREET LIGHTING	99
5.3 INSPECTION	99
5.3.1 ACCEPTANCE TESTING	99
5.4 STREET LIGHTING	100
5.4.1 WE ENERGIES OWNED AND MAINTAINED STREET LIGHTING.....	100
5.4.2 VILLAGE OWNED PUBLIC STREET LIGHTS	100
5.4.3 INSTALLATION.....	101
5.4.4 INSPECTION/APPROVAL	101

5. ROAD SYSTEM

Follow WDOT guidelines unless otherwise noted. Street designs shall be consistent with the Village's adopted Comprehensive Plan. All local roadways shall be posted at 25 mph and have a design speed of 30 mph. Private roads shall be designed in accordance with public road standards, even in PUD's.

5.1. GEOMETRICS

5.1.1. RIGHT-OF-WAY WIDTHS

Type	Minimum ROW Width (feet)
Local Street	60
Service Alley	30
Manufacturing and Industrial	80
Collectors and Arterials	Per adopted County Highway Width Map and/or Official Village Map

- Per Table 2 & 2A from Chapter 18 of Village of Germantown Municipal Code

5.1.2. PAVEMENT WIDTHS

5.1.2.1. Pavement widths are measured from edge of pavement to edge of pavement.

Standard Urban Residential Section Using Curb & Gutter (Face of curb to face of curb)	30 Feet
Standard Rural Residential Section With Open Ditches (Face of curb to face of curb)	24 Feet
Standard Commercial or Industrial Section	40 Feet

- Per Table 2 & 2A from Chapter 18 of Village of Germantown Municipal Code

5.1.3. BOULEVARD SECTIONS

5.1.3.1. Entrance

5.1.3.1.1. Minimum pavement width (flange to flange of curb and gutter) shall be 16 feet for a single lane.

5.1.3.1.2. Minimum pavement width (flange to flange of curb and gutter) shall be 24 feet for a double lane.

5.1.3.2. Exits

5.1.3.2.1. Minimum pavement width (flange to flange of curb and gutter) shall be 24 feet (double lane).

5.1.3.3. Minimum median width shall be 20 feet back of curb to back of curb.

5.1.3.4. Median length shall be adequate for queuing, but generally shall not extend beyond the first side street.

5.1.4. CUL-DE-SACS

5.1.4.1. Local streets open at one end only shall end with a cul-de-sac.

5.1.4.2. No less than 3 parcels and no more than 15 parcels may be served by a cul-de-sac. Block length between intersections shall not exceed 1,500 feet nor be less than 500 feet. Block length is measured from the center line of the right-of-way to the center line of the right-of-way of the two cross streets.

5.1.4.3. Residential:

5.1.4.3.1. All pavement widths for a standard residential cul-de-sac shall have a minimum bulb radius of 42 feet as measured from the center of the cul-de-sac to the edge of pavement.

5.1.4.3.2. The minimum bulb radius for the Right-of-Way shall be 66 feet as measured from the center of the cul-de-sac.

5.1.4.4. Commercial or Industrial:

5.1.4.4.1. All pavement widths for a standard commercial or industrial cul-de-sac shall have a 48-ft. radius measured from the center of the cul-de-sac to the face of curb.

5.1.4.4.2. The minimum radius for the Right-of-Way shall be 66 feet.

5.1.4.5. Central planting islands are acceptable in the middle of the cul-de-sac.

5.1.4.5.1. Minimum pavement width (edge of pavement to edge of pavement for rural cross-section or flange to flange for curb and gutter) shall be 16 feet for a single lane.

5.1.4.5.2. Plantings should be installed outside of the 5' clear zone for snow plowing.

5.1.5. CLOSE/LOOP STREET

5.1.5.1. The close or loop street, may be used in lieu of a short cul-de-sac, and shall be designed as two parallel lanes, 16-ft. wide lanes separated by a central planting strip or bio-retention area having a minimum width of 50 feet.

5.1.5.2. Maximum length for a close or loop street shall be 1,200 feet.

5.1.6. STREET GRADES (Profile)

Type	Max Grade
Arterial	4%
Collector	7%
Local	10%

5.1.6.1. Urban roadway sections shall have a minimum 0.7% centerline profile gradient.

5.1.7. CROSS SLOPE

5.1.7.1. All roadway sections (urban or rural) shall have a crown, with a cross slope of 3% from the pavement centerline to the edge of pavement.

5.1.8. HORIZONTAL CURVES

5.1.8.1. Minimum horizontal curve requirements, per WDOT Geometric Design of Highways and Streets, Current Edition including all updates.

5.1.8.2. Compound Curves

5.1.8.2.1. Compound curves are only allowed on roads with a posted speed limit of 25 mph or less.

5.1.8.2.2. A minimum horizontal curve radius of 250 feet is required along the roadway centerline.

5.1.8.2.3. A horizontal curve radius of 200 feet may be accepted when a 100' long tangent length is provided between curves.

5.1.9. VERTICAL CURVES

- 5.1.9.1. Maintain “K” Values per AASHTO Geometric Design of Highways and Streets, Current Edition including all updates.

5.1.10. SIGHT DISTANCE

- 5.1.10.1. For minimum sight distance requirements at intersections and driveways, refer to AASHTO Geometric Design of Highways and Streets, Current Edition including all updates.

5.1.11. INTERSECTION RADII

- 5.1.11.1. Internal to development for minor streets (measured from the edge of pavement/flange line):
 - 5.1.11.1.1. Residential and multi-family: 25 feet
 - 5.1.11.1.2. Commercial and industrial: 42 feet
- 5.1.11.2. Intersection radii at side roads, shall be as approved by the Village Engineer.

5.1.12. ACCELERATION/DECELERATIONS/BYPASS LANES

- 5.1.12.1. Any roadway intersecting with a collector or arterial street projected to have more than 100 ADT shall require Acceleration/Decelerations/Bypass Lanes per Detail Figure No. 4.

5.1.13. TRANSITIONS

- 5.1.13.1. Transitions areas, such as lane additions, bypass lanes, traffic shifting lanes, and areas between existing pavement and new pavement sections with varying widths, shall be transitioned based on speed and road type.

5.2. SPECIFICATIONS

These standards shall apply to all public and private roadways. Any and all modifications to these Specifications shall be approved by the Village Engineer. Please refer to AASHTO and WDOT for the most restrictive standard that will apply.

5.2.1. SUBGRADE

5.2.1.1. DESIGN STANDARDS

- 5.2.1.1.1. Soil borings to a minimum depth of 10 feet below finish grade shall be taken every 50-500 feet along the proposed centerline of the roadway. A site map showing the location of the borings along with laboratory soils classifications for each boring shall be submitted to the Village Engineer.
- 5.2.1.1.2. Should the geotechnical data submitted to the Village not be sufficient to satisfy the Village Engineer, the Developer shall grant the Village with a right of entry to obtain the required data. Costs associated with obtaining the required data shall be at the Developer’s sole expense.

5.2.1.2. INSTALLATION

- 5.2.1.2.1. The subgrade shall be proof rolled, checked for proper grade and approved by the Village Engineer or designee before crushed stone base and, if necessary geotextile fabric, is to be applied. Proof rolls are to be witnessed by a designated Village representative.
- 5.2.1.2.2. All earth fills under roadways shall be placed in 12” maximum lifts and a Proof Roll shall be witnessed by the Village Inspector or designated Village representative.
- 5.2.1.2.3. All soft spots located as a result of proof rolling with a fully loaded tri-axle truck approved by Village Engineer or designee shall be undercut and filled in a manner agreed upon by the Contractor and the Village Engineer.
- 5.2.1.2.4. All repaired soft spots shall be re-proof rolled after subgrade elevation has been re-established. Process shall be repeated until the project passes proof roll.

5.2.1.2.5. In unstable soil conditions, undercutting in excess of 3 feet shall be backfilled with 3" breaker run or other materials as approved in writing by the Village Engineer. 1-1/4 inch select crushed aggregate may also be used.

5.2.1.2.6. If open graded material is used, drainage at the bottom of the undercut is required by use of a French drain or perforated pipe bedded in crushed stone, where grades allow. In many situations, dense graded coarse TB shall be used to eliminate water that would be trapped if clear stone was used.

5.2.1.2.7. In unstable soil conditions, additional subdrains may be required as directed by the Village Inspector.

5.2.1.2.8. Method of drainage of the filled area shall be approved by the Village Inspector.

5.2.2. GEOTEXTILE FABRIC

5.2.2.1. MATERIAL

5.2.2.1.1. Geotextile fabric conforming to WisDOT Standard Specification, Section 645 shall be pre-approved by the Village Engineer prior to installation for:

- A. subgrade separation and stabilization (Type SAS)
- B. drainage filtration (Type DF)
- C. subgrade reinforcement (Type SR)
- D. under riprap (Types R & HR).

5.2.2.2. INSTALLATION

5.2.2.2.1. Geotextile fabric shall be placed on substandard subgrade in all areas that will receive crushed aggregate base course material, unless a Clear Stone Frost Barrier is to be used.

Geotextile fabric is not required where Clear Stone Frost Barrier is to be used.

5.2.2.2.2. Geotextile fabric shall have a minimum 24" overlap for longitudinal seams and minimum 36" overlap for transverse seams.

5.2.2.2.3. Subsequent open cuts of the pavement requiring excavations below the subgrade of roadways having geotextile fabric in place shall be backfilled with approved slurry.

5.2.3. BASE COURSE

5.2.3.1. MATERIALS

5.2.3.1.1. The crushed aggregate base course for the roadway shall consist of dense graded base conforming to WisDOT Standard Specification Section 305.2.2.1 for 1 1/4-inch.

5.2.3.2. INSTALLATION

5.2.3.2.1. The finished base course elevation shall be a minimum of:

- A. 10" above the approved subgrade for a local roadway,
- B. 14" above the approved subgrade for a commercial or industrial roadway

5.2.3.2.2. New Construction or Reconstruction:

- A. Bottom Layer: 3" gradation crushed interlocking limestone aggregate from a quarry source
- B. Middle Layer: 1 1/4" gradation crushed interlocking limestone aggregate from a quarry source
- C. Quarry Source: Quarry source shall be listed on the WisDOT Pit and Quarry Listing (latest edition) and be approved by Germantown.
- D. Gradations shall conform to WisDOT Standard Specifications Sec. 305

5.2.3.2.3. Pulverize & Overlay: Pulverized pavement acceptable when recommended by Geotechnical Services Report, as approved by the Village Engineer.

5.2.3.2.4. The dense graded base shall be spread, shaped, compacted, and proof-rolled to produce a stabilized base which conforms to the required cross-sections.

- 5.2.3.2.5. Special compaction testing may be required dependent on-site conditions in accordance with 301.3.4.3 of the WisDOT Standard Specifications at the contractor's expense.
- 5.2.3.2.6. Surface Elevation tolerance to be +/- 1/2 inch.
- 5.2.3.2.7. Base course to be compacted to 95% Modified Proctor and conform to WisDOT Standard Specification 305.3.2

5.2.4. FROST BARRIER – As required by the Village Engineer

5.2.4.1. MATERIALS

- 5.2.4.1.1. The Frost Barrier shall be #3 Clear Stone with a minimum depth of 12" or as specified for a given project.

5.2.4.2. DESIGN STANDARDS

- 5.2.4.2.1. Where specified by the Village, a layer of Clear Stone Frost Barrier shall be required to prevent or minimize future frost heave damage to the roads.

5.2.5. SHOULDERS

5.2.5.1. MATERIALS

- 5.2.5.1.1. The aggregate for shoulder shall consist of: Crushed stone conforming to WisDOT Standard Specification Section 305.2.2.1 for ¾-inch dense graded base; or Recycled asphalt as approved by the Village Engineer.

5.2.5.2. DESIGN STANDARDS

- 5.2.5.2.1. For rural cross sections, a minimum 4-ft. wide shoulder shall be constructed, with recycled asphalt, along both edges of pavement.

5.2.6. ASPHALT PAVEMENT

5.2.6.1. MATERIALS

- 5.2.6.1.1. Asphalt pavement materials shall conform to the requirements of the Wisconsin Asphalt Pavement Association's (WAPA) latest pavement design guide.
 - A. Mix designs for all other classifications shall be as approved by the Village Engineer.

5.2.6.2. INSTALLATION

- 5.2.6.2.1. All asphalt binder courses shall be constructed on a dry, rolled and compacted crushed stone base, free of loose and foreign materials. Hand operated vibrating compactors shall be used around all manholes and valve boxes.
- 5.2.6.2.2. A tack coat, meeting the requirements of WisDOT Standard Specification Section 455.2.5, shall be used as a bonding agent between binder and surface courses, and the separate lifts of binder when not placed on the same day. The binder surface shall be thoroughly cleaned and any debris removed prior to applying the tack coat. Tack coat shall be uniformly applied at a rate of 0.07 gallon per square yard with an allowable variation of +/- 0.02 gallon per square yard over the entire receiving surface. Daily application of the tack coat shall be limited to approximately that area of surface that can reasonably be expected to be paved during the same day.
- 5.2.6.2.3. Saw cutting
 - A. When saw cutting existing concrete or asphalt pavements, curb and gutter, driveways, or sidewalks, the saw cut shall be straight, and shall be full depth.
 - B. No payment shall be made for sawing that is not straight or for sawing where the sawing debris is not washed off of the pavement or driveways.
 - C. Longitudinal joints in the surface course shall at no time be placed immediately over similar joints in the binder course beneath, with the exception of the centerline. A minimum distance

of 6" shall be required between the location of the joints in any given course and the location of similar joints in the course placed above it unless approved by the Village Engineer.

5.2.6.2.4. Paving shall be done in stages so that the first pass does not cool below 125° F, prior to second pass of the next lane.

5.2.6.2.5. Any asphalt paving after October 15th of any year shall be done only with special, alternate methods approved by the Germantown Village Engineer.

5.2.6.2.6. If the roadway will not receive the final lift prior to October 15th, a minimum 18" wide wedge of asphalt shall be placed against the flange line for protection.

5.2.6.2.7. On roadways with rural cross-section, the edge of the pavement shall be sloped, and no materials shall extend beyond the limits of the previous layer. Irregularities in alignment along the outside edges shall be corrected by adding or removing asphalt. Excess asphalt deposited on the existing base, binder or surface course outside the limits of the lane being laid, shall be immediately removed.

5.2.6.2.8. Prior to placement of the surface course:

A. All foreign matter shall be removed from the binder course surface.

B. On streets with curb and gutter, the 18" wide wedge of protective asphalt previously placed against the curb and gutter shall be removed by milling.

C. Developer/Contractor, at his sole expense, shall repair any depressions or other signs of failure in the binder course as directed by the Village Engineer.

D. Developer/Contractor, at his sole expense, shall repair any damaged curb and gutter as directed by the Village Engineer.

E. All manhole rims and water valve boxes shall be left 3/8" –1/2" below binder course and adjusted to 3/8" –1/2" below the final pavement elevation prior to placement of surface course of asphalt. Paving rings which have an adjustable diameter are not allowed.

5.2.6.2.9. All excavations associated with manhole adjustments shall be backfilled with slurry as specified in Standard Specification for Sewer and Water Construction in Wisconsin Section 8.43.8. The slurry shall be backfilled to 6-inches below the final pavement elevation for residential, commercial, and industrial streets.

5.2.6.2.10. Asphalt pavement installation will not be permitted after October 15th unless approved by the Village Engineer.

5.2.6.2.11. Asphaltic binder course shall not be installed after October 1st, unless approved by the Village Engineer.

5.2.6.2.12. Asphaltic surface course shall be installed in the same calendar year as the binder course, unless approved by the Village Engineer.

5.2.7. CONCRETE PAVEMENT

The use of concrete pavement requires the approval of the Village Engineer.

5.2.7.1. MATERIALS

5.2.7.1.1. Portland Cement and aggregates used in all concrete mixes shall conform to WisDOT Standard Specification Section 501.

5.2.7.1.2. Aggregates used in concrete shall conform to the requirements of WisDOT Standard Specification Section 501.

5.2.7.1.3. Concrete shall be air entrained, Grade A, conforming to WisDOT Standard Specification Section 501, and in particular, meet the following requirements:

A. Minimum concrete content, 6.0 sacks per cubic yard;

- B. Compressive strength after 28 days cured: 4,000 psi;
- C. Maximum amount of water per bag of cement: 6.0 gallons;
- D. Size of course aggregates required: No. 1 plus No. 2;
- E. Slump: 1"-3"; and
- F. Air content: 4.5% - 7.5%.

5.2.7.2. DESIGN STANDARD

Pavement Thickness (in)	Dowel Bar Dia. (in)	Joint Spacing (ft)
5 ½, 6, 6 ½	None	12
7, 7 ½	1	14
8, 8 ½	1 ¼	15
9, 9 ½	1 ¼	15
10 and above	1 ½	15

5.2.7.2.1. Alternative designs, such as high early, shall be as approved by the Village Engineer.

5.2.7.3. INSTALLATION

- 5.2.7.3.1. Contractor shall submit a mix design 10 days prior to paving and receive the approval of the Village Engineer.
- 5.2.7.3.2. A pre-pour meeting shall be scheduled with the Village's Engineering Department prior to paving.
- 5.2.7.3.3. Water used shall conform to WisDOT Specification Section 501.2.4. If Village water is used, it will be charged at the current rates for such use; a PERMIT IS REQUIRED from the Water Utility for any Village water use.
- 5.2.7.3.4. The consistency of the concrete shall be such that when measured by means of a 4" x 8" x 12" slump cone, the slump shall not exceed 3".
- 5.2.7.3.5. Test cylinders shall be required meeting AASHTO standards, stored under site conditions and then tested at Contractor expense. Testing to be performed by a licensed geotechnical consultant i.e. third party must make and test cylinders. Three test cylinders per 1,000 lineal feet shall be taken during the course of the curb and gutter operations. A testing firm, hired by the Developer, shall pick up the cylinders at the project site within 24 hours of paving, break the cylinders at the appropriate time (7, 14, and 28 days) and submit a test report to the Developer. The Developer shall submit a copy of the report to the Village Engineer or designee.
- 5.2.7.3.6. Concrete pavement shall be constructed in accordance with WisDOT Standards Specifications, Section 415.
- 5.2.7.3.7. Curing Time and Cleanup
 - A. Concrete pavements shall be closed to all traffic for 7 days unless otherwise directed by the Village Engineer. When directed to open the street to vehicular traffic, the Contractor shall clean the area of all forms, lumber, dirt and other debris to the satisfaction of the Village Engineer. The Contractor shall then flush and sweep the street.
 - B. When a concrete saw has been utilized to cut joints, the Contractor will be required to flush the pavement with water, removing all residual materials of the sawing operation, prior to opening the street to vehicular traffic.

C. Apply curing agent according to Wisconsin Concrete Paving Association (WCPA) Concrete Pavement and Flatwork Specification Guide.

5.2.7.3.8. Concrete Placement During Cold Weather (Follow WisDOT Specifications)

A. Concrete shall not be placed on a frozen subgrade. The Contractor shall remove and replace at his expense any concrete damaged by frost or freezing.

B. When placing concrete during cold weather, the water and the aggregates in the concrete mixture may be heated. When specifically allowed by the Village Engineer, the Contractor may use magnesium free calcium chloride as an admixture in the concrete. The maximum quantity to be used shall not exceed 1% of the cement content of the mix.

C. When the air temperature is expected to drop below freezing, the Contractor shall cover the surface of the concrete with straw, hay, or blankets to a sufficient depth to prevent freezing and such protection shall be furnished for at least 5 days after the concrete has been poured. Other methods of protection from freezing may be used when approved by the Village Engineer.

5.2.8. **ADMIXTURES**

5.2.8.1. Water Reducing

The Contractor may incorporate into the concrete mixture an approved water reducing admixture meeting the requirements of AASHTO Specification M-194, Type A or D when approved by the Village Engineer. The cement content may be reduced to 5.8 sacks per cu. yd. when the admixture is used at the manufacturer's recommended rate.

5.2.8.2. Accelerator: When specifically allowed by the Village Engineer, the Contractor may use magnesium free calcium chloride as an admixture in the concrete. The maximum quantity to be used shall not exceed 1% of the cement content of the mix.

5.2.9. **CURB AND GUTTER**

5.2.9.1. MATERIALS

5.2.9.1.1. All concrete curb construction shall conform to WisDOT Standard Specification, Section 601.

5.2.9.1.2. Concrete for curbs shall be air entrained, Grade A, conforming to WisDOT Standard Specification Section 501, and in particular, meet the following requirements:

A. Minimum concrete content: 6.0 sacks per cubic yard;

B. Compressive strength after 28 days cured: 4,000 psi;

C. Size of coarse aggregates required: No. 1;

D. Slump: 1"- 3"; and

E. Air content: 4.5% - 7.5%.

5.2.9.1.3. Concrete that is rejected on the work site for any reason shall not be re-tempered and used in the work without specific approval of the Village Engineer.

5.2.9.1.4. Concrete Curb and Gutter shall be a standard 6" vertical face curb and gutter type that is 30" wide (6" top curb and 24" flange), 9½" deep at the flange and 14" deep at the back of curb.

5.2.9.1.5. Concrete Curb joints to be spaced at 10 ft. intervals.

5.2.9.1.6. A V-Bottom mountable curb and gutter type that is 30" wide, 9" deep at the flange and 12" deep at the back of curb may be allowed at the discretion of the Village Engineer, on local streets only.

5.2.9.1.7. Where connection is made to existing road, dowels (longitudinally) are required.

Dowels conforming to WisDOT Standard Specification Section 505.2.6, shall be installed per WisDOT Standard Specification Section 416.3.6.

5.2.9.1.8. Where connection is made to existing curb and gutter, ties (transversely) are required.

Ties conforming to WisDOT Standard Specification Section 505.2.6, shall be installed per WisDOT Standard Specification Section 416.3.6.

5.2.9.2. DESIGN STANDARDS

5.2.9.2.1. Minimum curb grade: 0.7 % (along the gutter flow line).

5.2.9.3. INSTALLATION

5.2.9.3.1. Before the concrete is placed, the crushed aggregate base course under the curb and gutter shall be checked for correct elevation.

5.2.9.3.2. The concrete shall be placed in as nearly a continuous operation as possible.

5.2.9.3.3. Three test cylinders per 1,000 lineal feet shall be taken during the course of the curb and gutter operations. A testing firm, hired by the Developer, shall pick up the cylinders at the project site within 24 hours of paving, break the cylinders at the appropriate time (7, 14, and 28 days) and submit a test report to the Developer. The Developer shall submit a copy of the report to the Village Engineer or designee.

5.2.9.3.4. Prior to applying curing material on the concrete, the face of the curb shall be "branded" with a "W" designating the location(s) of water services, "S" designating the location(s) of sanitary laterals and "SS" for storm sewer laterals. Physical placement of the branding shall be reasonably accurate in a vertical plane above the respective lateral.

5.2.9.3.5. Prior to applying curing material on the concrete, the face of the curb shall be stamped with the contractor's name and year of installation. A stamp is required for each non-contiguous section of curb and gutter.

5.2.9.3.6. The concrete surface shall be sealed, once concrete has set up enough to prevent marring or dilution of surface, by spraying a uniform coating of white curing material meeting the requirements of WisDOT Standard Specification Section 415.2.4, in such a manner as to provide a continuous water-impermeable film on the entire concrete surface which includes the back of the curb and gutter.

5.2.9.3.7. Transverse contraction joints for curbs shall be cut or sawed 1/3 the depth of pavement at a maximum 10-foot intervals. One-inch expansion joints shall be provided at ends of radii, points of considerable change in grade and alignment, at intervals not to exceed 300 feet and where abutting existing curb and gutter.

5.2.9.3.8. Concrete curb and gutter shall cure a minimum of days, based on cylinder breaks, prior to backfilling and crushed stone base installation.

5.2.9.3.9. 10 days after the curbs have been placed, or as determined by the 7-day cylinder breaks, and the Village has approved the concrete work, the Contractor shall immediately backfill behind the curbs to preclude any erosion or undermining.

5.2.10. ROAD UNDERDRAIN PIPE

5.2.10.1. MATERIALS

5.2.10.1.1. A continuous 4" diameter perforated, corrugated polyethylene drainpipe, meeting the requirements of AASHTO Designation: M-252, shall be installed under the curb and gutters and extend 25 feet in either direction from storm water catch basins located at low points. For catch basins in other locations, the 25-ft. drainpipe shall be connected only to the upstream side.

5.2.10.1.2. Pipe perforations may be holes or slots and may be in 3 or 4 lines spaced around the circumference of the pipe at 120° or 90° respectively. The end of the drainage pipe opposite the catch basin shall be capped with a cap suitable for installing on the drainage pipe of midstream structures.

5.2.10.1.3. Enough geotextile fabric shall be provided as to cover the sides and bottom of the trench and overlap across the top of the trench by a minimum of 4 inches or the pipe in a sock may be used, see Detail Figure No. 7.

5.2.10.1.4. The trench shall be backfilled with open graded $\frac{3}{4}$ " clear stone.

5.2.10.2. INSTALLATION

5.2.10.2.1. The 4" drainage pipe shall be laid in an 8" deep by 8" wide trench with flat bottom with square sides. The trench, constructed at an elevation lower than the base course, shall be aligned with the proposed centerline of the flange of the curb and gutter. Any damaged drainpipe shall be replaced before the open graded stone is backfilled in the trench.

5.2.11. DRIVEWAYS

5.2.11.1. DESIGN STANDARDS

5.2.11.1.1. Driveway approaches are to be constructed by removing existing curb and gutter and installing poured in-place concrete. This activity requires a Driveway Approach Permit issued by the Village.

5.2.11.1.2. Driveway slopes shall not exceed 10%.

5.2.11.1.3. Driveway slopes shall not exceed 5% in all areas within 25 feet of a building.

5.2.11.1.4. For commercial, industrial and multi-family buildings, if the initial 25 feet of driveway is deemed to be an accessible passenger loading zone, the American Disabilities Act (ADA) requires accessibility routes with longitudinal slopes of not greater than 5% and cross slopes of 2% to be connected to the loading zone and the accessible building entrance.

5.2.11.1.5. AASHTO Sight Distance requirements shall be required at all driveway locations.

5.2.11.1.6. Sidewalks located behind driveway **approaches** should be the same thickness as the driveway.

5.2.11.2. RESIDENTIAL DRIVEWAYS

5.2.11.2.1. Only one driveway is allowed per parcel for residential developments.

5.2.11.2.2. For multi-family developments, the Plan Commission may grant one or more additional access points, based on the size of the development.

5.2.11.2.3. All residential driveways along roadways with vertical face curb and gutter and side path shall be constructed with a driveway apron.

5.2.11.2.4. Residential width at curb or shoulder = 25' max

5.2.11.3. COMMERCIAL DRIVEWAYS

5.2.11.3.1. The number of commercial driveways shall be the minimum necessary to provide reasonable access for regular traffic and emergency vehicles, while preserving operations and safety along the public roadway. Unless a Traffic Impact Analysis (TIA) shows that a single driveway cannot provide this, only one driveway access will be permitted unless one or more of the following conditions are met.

5.2.11.3.2. The continuous frontage of the parcel is over 300 feet long, in which case an additional driveway per each 300 feet or frontage may be granted by the Plan Commission. Commercial or Retail width at curb or shoulder = 45' max

- 5.2.11.3.3. Two one-way driveways may be permitted along frontage of at least 150 feet provided the driveways do not interfere with operations at other driveways or along the street.
- 5.2.11.3.4. The Plan Commission may determine additional driveways are justified due to the amount of traffic generated by the use without compromising traffic operations along the public street.
- 5.2.11.3.5. All commercial driveways along roadways with vertical face curb and gutter shall be constructed with a minimum of a driveway apron. Certain locations with heavy amounts of traffic will need to use a street type entrance as directed by the Village Engineer.

5.2.11.4. INSTALLATION

- 5.2.11.4.1. The concrete surface shall be sealed, after the concrete has set up substantially to avoid marring or damage to the concrete, with a uniform coating of curing material meeting the requirements of WisDOT Standard Specification Section 415.2.4, in such a manner as to provide a continuous water-impermeable film on the entire concrete surface. Back of flatwork must be sprayed as well.
- 5.2.11.4.2. Concrete driveway approaches shall be a minimum of 7" thick. Sidewalks behind driveway approaches shall be the same thickness as the driveway.
- 5.2.11.4.3. Asphalt driveway approaches shall be a minimum of 3" thick.
- 5.2.11.4.4. The modification of the curb and gutter and the construction of the driveway approach shall be done in accordance with the driveway approach permit and the construction detail.
- 5.2.11.4.5. Concrete curb and gutter shall not be saw cut horizontally at driveways. Reconstruction of the curb and gutter is required with pavement ties and felt.
- 5.2.11.4.6. Expansion joint material, ½" thick for full depth of concrete, shall be placed between the curb and gutter and the approach. Ties shall be required at the joints between existing curb and new curb.

5.2.12. PARKING LOTS

- 5.2.12.1. Parking lots shall be designed and constructed according to the standards in the Village of Germantown Code Section 17.45
- 5.2.12.2. Off street parking lots shall be designed to accommodate traffic volumes and pedestrian circulation based on the land use served. And should be situated as close to accessible building entrances as possible.
- 5.2.12.3. The internal circulation pattern shall be designed with 24-ft. wide driving aisles (measured from edge of pavement marking to edge of pavement marking) for two-way traffic to allow users to maneuver in an efficient & safe manner.
- 5.2.12.4. The use of landscaped islands & medians shall be used to provide positive guidance to motorist and establish proper driving patterns.
- 5.2.12.5. Sidewalks adjacent to parking stalls shall be 8 feet wide. Smaller sidewalks may be allowed with prior Village approval. Appeals may be made to the Plan Commission.
- 5.2.12.6. Turning radii for a single unit truck (SU Design Vehicle) shall be provided as a minimum to all portions of the lot.
- 5.2.12.7. Slope shall be 2% max in all directions
- 5.2.12.8. The van-to-regular accessible space ration should equal 1:6.
 - 5.2.12.8.1. Stall dimensions should be as follows:
 - A. Stall Lengths = 20 foot min.

B. Stall Widths:

- i. Car = 9 foot min.
- ii. Van = 11 foot min; or 8 foot min with 8 foot aisle.

5.2.12.9. Signage and pavement marking required for each stall.

5.2.12.10. Pavement:

- 5.2.12.10.1. General parking areas are recommended to have at least a minimum of 8-inches of crushed aggregate base course and 2-inches of 3 LT 58-28S Asphaltic Concrete and 2 inches of 4 LT 58-28S Asphaltic Concrete.
- 5.2.12.10.2. Areas of heavy traffic, such as loading docks, shall have at least a minimum of 10-inches of crushed aggregate base course and 4-inches of 3 LT 58-28S Asphaltic Concrete and 4 inches of 4 LT 58-28S Asphaltic Concrete. Inverted parking lots are discouraged.

5.2.13. SIDEWALK AND PATHWAYS SIDEPATHS AND TRAILS

5.2.13.1. MATERIALS

- 5.2.13.1.1. Concrete **for side paths (SIDEWALK)** shall be ~~air-entrained~~, Grade A, conforming to WisDOT Standard Specifications, Section 501, meeting the following requirements:
 - A. Minimum concrete content, 6.0 sacks per cubic yard;
 - B. Compressive strength after 28 days cured: 3,500 psi;
 - C. Maximum amount of water per bag of cement: 6.0 gallons;
 - D. Size of course aggregates required: No. 1 plus No. 2;
 - E. Slump: 1"-3"; and
 - F. Air content: 4.5% - 7.5%.

- 5.2.13.1.2. **Side paths (SIDEWALK)** are to be constructed of 5-inches of concrete over a 4-inch crushed aggregate base course.

- 5.2.13.1.3. Driveway crossings shall be 7-inches of concrete over a 6-inch crushed aggregate base course.

- 5.2.13.1.4. **PATHWAYS Trails** shall be constructed of a 4 LT 58-28S mix asphalt 3-inches thick over a 5-inch crushed aggregate base course or as directed by the Village Engineer.

5.2.13.2. DESIGN STANDARDS

- 5.2.13.2.1. Current and future planned side path and trail locations are identified in the Village's Comprehensive Plan. Any development that occurs on or adjacent to these locations is required to connect to, or construct its portion of the system, if not currently in place, or provide detailed rationale and request a waiver from the Plan Commission and/or Common Council

- 5.2.13.2.2. **SIDEWALK AND PATHWAYS Side paths** shall be separated from the street by a minimum 6-foot wide grassy terrace with shade trees.

- 5.2.13.2.3. The outside edge of side paths shall be located 1-foot from the right-of-way line or as directed by the Village Engineer except at intersection crossings. At intersection crossing, the proper placement shall be determined by the location of the crosswalk and as directed by the Village Engineer.

5.2.13.2.4. Width of Sidepath:

Local Roads	5 Feet
Collectors and Arterials	6 Feet

5.2.13.2.5. **PATHWAYS** ~~Trails~~ shall be a minimum of 10 feet wide with 2 feet of gravel shoulder on both sides and in conformance with AASHTO's Guide for the Development of Bicycle Facilities.

5.2.13.2.6. Traverse grade of 2% (1/4" per foot) draining toward the road.

5.2.13.2.7. The maximum allowed longitudinal grade shall be 5%. This grade shall not be exceeded unless the road grade is of a steeper grade, in which case the longitudinal sidewalk grade shall not exceed the road grade.

5.2.13.3. INSTALLATION

5.2.13.3.1. Sidewalk shall be placed by formed methods.

5.2.13.3.2. Contraction joints shall be not less than ¼" wide and ½" deep. Contraction joint spacing shall be 5' or as directed.

5.2.13.3.3. Expansion joints shall be located at a minimum 100 ft O.C. Finished joints shall have ¼" radius. After floating, troweling, and jointing, the concrete shall be brushed with a damp bristle brush.

5.2.13.3.4. Prior to applying curing material on the concrete, the face of the side path shall be stamped with the contractor's name and year of installation. A stamp is required for each non-contiguous section of side path.

5.2.13.3.5. The concrete surface shall be sealed, directly after finishing operations, with a uniform coating of white curing material meeting the requirements of WisDOT Standard Specification Section 415.2.4, in such a manner as to provide a continuous water-impermeable film on the entire concrete surface.

5.3. INSPECTION

Contractor shall be responsible for the horizontal and vertical control.

5.3.1. ACCEPTANCE TESTING

5.3.1.1. Tests

5.3.1.1.1. The subgrade shall be inspected before the crushed stone base may be applied. This inspection is done by the Village Inspector or its contracted inspection services. An average tolerance of +/- 0.04-ft. from the approved subgrade elevation shall be allowed.

5.3.1.1.2. The base course shall be inspected and approved by the Village Inspector before the first layer of asphalt can be placed. An average tolerance of +/- 0.04-ft. from the approved base course thickness shall be allowed. Improvements to the base course may be required if, in the opinion of the Village Engineer, conditions for paving do not meet the standard of the Village Engineer.

5.3.1.1.3. A Village Inspector shall be present for the placement of all-concrete curb and gutter. This includes the inspection of the base under the curb and gutter, and a check of the alignment and grade of the curb and gutter.

5.3.1.1.4. Three test cylinders per 1,000 lineal feet shall be taken during the course of the curb and gutter operations. A testing firm, hired by the Developer, shall pick up the cylinders at the project site within 24 hours of paving, break the cylinders at the appropriate time (7, 14, and 28 days) and submit a test report to the Developer. The Developer shall submit a copy of the report to the Village Engineer or designee.

5.3.1.1.5. Curb and gutter elevations will be considered acceptable if certified elevations (by the Village Inspector) are within ¼" of design elevations.

- 5.3.1.1.6. If evidence indicates that there is standing water in the gutter flange, that portion of the curb and gutter shall be reconstructed to establish positive drainage.
- 5.3.1.1.7. A Village inspector shall be present whenever any asphalt pavement is being constructed.
- 5.3.1.1.8. Asphalt to be placed on a roadway, shall arrive at the job site at a temperature of 275° F +/- 25° F. The asphalt inspector will periodically test the temperature of the arriving trucks for the temperature of the asphalt. Any trucks not falling within the guidelines for asphalt temperatures shall be rejected. Paving shall not be done at temperatures below 40 degrees F.
- 5.3.1.1.9. Both the binder course and the surface course shall be compacted to not less than 91.5% maximum density. Contractor shall have testing done by an independent Lab unless otherwise approved.
- 5.3.1.1.10. An average tolerance of +/- 0.04-ft. for the binder thickness and +/- 0.04-ft. from the approved final pavement surface elevation shall be allowed.

5.4 STREET LIGHTING

This section covers lighting for Municipally owned streets, walkways, parking lots and Parks. The Municipal Lighting is comprised of Municipally owned and maintained lighting and street lighting owned and maintained by We-energies.

5.4.1 WE-ENERGIES OWNED & MAINTAINED STREET LIGHTING

- 5.4.1.1 This lighting system is owned and maintained by We-energies. We-energies performs the installation and maintenance on all the light poles owned by We-energies.
- 5.4.1.2 The LED lighting fixture and pole approved by the Village of Germantown is:

- 5.4.1.2.1 Pole- #20L-LEG-FG Smooth-25'-Bronze
- 5.4.1.2.2 LED Fixture-LED-3K-Rectangular-Low-Bronze-Class "D"

5.4.2 VILLAGE OWNED PUBLIC STREET LIGHTS

- 5.4.2.1 The light fixtures & poles owned and maintained by the Village of Germantown fall into several categories of application. Areas of use are for street lighting, lighting along walkways, parking lot lighting (does not include private) and Parks. The type and specific light fixtures and poles to be approved by the Village Engineer/Highway Superintendent.
- 5.4.2.2 Street Light Approved Materials:
 - 1) Control Cabinet; Eagle Traffic Control Systems Model Size – M or sized to match project.
 - 2) Concrete Pole by "Traditional Concrete, Inc Model #D715-SP-EA-3x4TO (use with Harp Lights)
 - 3) Aluminum Pole by "hapco". Drawing # B82525-001
 - 4) Steel Round Light Pole by LSI; # 5RP-B5-S07G-28-S-BRZ-DGPGA
 - 5) Harp Series Light Fixtures by "Holophane; 55w-4K-AS-3-B-5-A
 - 6) Milwaukee Harp LighWis

- 7) ts by TAPCO; Model MH100 w/LED 203-100525121421
- 8) Roadway Luminaire by Eaton; # OVH-E20-LED-E-U-T3-AP-U-K ARM A25410 or A69771
- 9) Area Luminaire by Eaton; # RDG-E02-LED-E-U-T3-BZ-U-7050 ARM A25410 or A69771
- 10) Mirada Medium LED Area Light by LSI; # MRMLED12LSIL3UNVDIM4070CRI-BRZ
- 11) Pole Mounting Bracket by LSI; BKSPQMHCLR
- 12) LED Bollard Light by Traditional Concrete, Inc; # D303-SP-EA-10 w/CAV6-LED Light Fixture
- 13) Casting Lid for CMP Junction Box by Neenah Foundry # R-5900-E (Electric Lid)
- 14) Enclosure Box-Polymer Concrete by Quazite; (12"x12") #PC1212BA12; LID #PC1212CA0017 (w/electric logo)
- 15) Enclosure Box-Polymer Concrete by Quazite; (13"x24") #PG1324BA12; LID #PG1324HA00017A (w/ electric logo)

Commented [KD1]: Are these still accurate?

5.4.2.3 Street Lighting Cabinet

Cabinet may vary in size depending on project but shall be bare stainless steel and surface mounted to concrete base.

Concrete base shall follow Wisconsin DOT standards. Base type to match cabinet size.

Cabinet should be sized for expansion of system if necessary.

Photo control shall be in the lighting cabinet and run all lighting.

Cabinet shall include "Hand Off Auto" switch for testing.

Cabinet shall have 1 duplex outlet.

Cabinet shall include 1 light switched to door open/closed.

Cabinet shall have at least 1 pull box in proximity (within 5') for splitting wiring/circuits.

Cabinet shall have a minimum of 4 unused 2" conduits between concrete base and pull box for future expansion.

5.4.3 INSTALLATION

- 5.4.3.1 See the typical drawing in section 8.2.16 (Details) for the typical installation of the Public owned streetlights. All other installations shall be approved by the Village Engineer.

5.4.4 INSPECTION/APPROVAL

- 5.4.4.1 An electrical permit must be obtained from the Village Building Inspection Department for the new electrical service installation and the installation of all lighting wire

installation. Approval will include sign off by electrical inspector and Village Engineer/Street Superintendent.

TABLE OF CONTENTS

6 PROJECT CLOSE-OUT DOCUMENTS	103
6.1 CONSTRUCTION INSPECTOR BINDER	103
6.2 LIEN WAIVERS	103
6.3 RECORD DRAWINGS	103
6.3.1 GENERAL	103
6.3.2 SANITARY SYSTEM	105
6.3.3 WATER SYSTEM	106
6.3.4 STORM SYSTEM	107
6.3.5 ELECTRICAL SYSTEM	107
6.3.6 GRADING CERTIFICATION PLAN	107
6.3.7 STORM WATER BMP CERTIFICATION PLAN	108
6.4 EASEMENTS	109
6.4.1 GENERAL	109
6.4.2 STORM SYSTEM	109

6. PROJECT CLOSE-OUT DOCUMENTS

6.1. CONSTRUCTION INSPECTOR BINDER

Village Inspector shall provide the Village with a Construction Inspection Binder including the following documents.

- 6.1.1. Material Submittals
- 6.1.2. Inspection Reports
- 6.1.3. Test Results/Reports
- 6.1.4. Change Orders / Substitutions
- 6.1.5. Punch list
- 6.1.6. Pay Applications
- 6.1.7. Final Record Set of Construction Plans
- 6.1.8. Warranty waivers (if any)

6.2. LIEN WAIVERS

Developer shall provide the Village with all lien waivers pertaining to the Public Infrastructure prior to final acceptance by the Village.

6.3. RECORD DRAWINGS

6.3.1. GENERAL

- 6.3.1.1. Plans shall be prepared by the Contractor on sheets measuring ~~12" high by 36" wide~~ 24 inches by 36 inches and show Plan and Profile for all sections of underground utilities. Sheets shall have minimum margins of ½ inch on all sides.
- 6.3.1.2. The title block shall be in the lower right corner of the as built and include at a minimum, the following information:
 - 6.3.1.2.1. Village of Germantown or Consultants Logo
 - 6.3.1.2.2. Location of Utility: Street or Easement
 - 6.3.1.2.3. Record Drawing File Number (Provided by Village Engineer)
 - 6.3.1.2.4. Inspected By
 - 6.3.1.2.5. Date of Plan Approval
 - 6.3.1.2.6. Name of Contractor
 - 6.3.1.2.7. Date of Construction
 - 6.3.1.2.8. Scale (text and line)
 - 6.3.1.2.9. A table of quantities for all utilities shown on each sheet.
 - 6.3.1.2.10. Signature Line for Village Engineer.
- 6.3.1.3. North shall be to the top or right of the sheet and shall be shown by a 2" long north arrow, clearly, shown without intrusion.
- 6.3.1.4. The scale of the record drawings shall be same as construction drawings, 1"=50' or 1"=40'. This shall be shown with a graphic scale and text.
- 6.3.1.5. The seal and signature of the professional engineer responsible for the preparation of the record drawing shall be shown immediately adjacent to the title block.
- 6.3.1.6. All existing lot, property, and utility easement lines in the area in which the utility is located shall be shown.

- 6.3.1.7. Screen any existing features, including but not limited to building corners and parking lots.
- 6.3.1.8. The address, lot and block numbers, and subdivision or development name shall be indicated. Addresses shall be labeled with italics. Unplatted lands and the address of any home on such lands shall be so indicated.
- 6.3.1.9. All street names shall be clearly shown.
- 6.3.1.10. Two SEWRPC reference benchmarks shall be shown on each sheet.
- 6.3.1.11. Plan sheets shall start and terminate at match lines.
- 6.3.1.12. Pipe invert elevations shall be clearly shown.
- 6.3.1.13. Screening of existing sanitary sewer, storm sewer and watermain and service locations either in screened or dashed format.
- 6.3.1.14. Dimensions showing offset from right-of-way and roadway or easement centerline to utility alignment.
- ~~6.3.1.15. Concurrent with the hard copy submittal, Provide complete set of records printed on record drawing paper as approved by the Village Engineer.~~
- 6.3.1.16. Provide complete set of records in PDF format.
- 6.3.1.17. Provide complete set of records in AutoCAD (.DWG) format ~~on CD~~ tied to the Wisconsin State Plane NAD ~~1927~~1983 Wisconsin South Grid coordinate system and profiles in NAVD 1988.
- 6.3.1.18. The cost of archiving the record drawings and insertion of the data into the Village's GIS System shall be the sole responsibility of the DEVELOPER.

6.3.2. SANITARY SYSTEM

- 6.3.2.1. A general note on each sheet giving the size, class, type, ASTM designation, and manufacturer of every main and lateral shall be shown, with material quantities clearly tabulated. Complete information on manhole frames / lids / barrel structure shall be noted. Manholes shall be ID'd with Systems Plan Number provided by Village Engineer on record drawing.
- 6.3.2.2. Sanitary mainline should be thickest line on plan.
- 6.3.2.3. The percent grade, direction of flow, and center to center length of sanitary sewer installed between manholes and laterals shall be shown.
- 6.3.2.4. All laterals shall have invert elevations at right-of-way lines or easement line and lengths clearly shown.
- 6.3.2.5. The following information shall be shown for each manhole:
 - 6.3.2.5.1. Invert elevation of each sewer pipe
 - 6.3.2.5.2. Rim Elevation
 - 6.3.2.5.3. Pipe size of each sewer
 - 6.3.2.5.4. Type of frame to chimney seal
- 6.3.2.6. Indicate External seals or internal chimney seals
- 6.3.2.7. All record drawings shall reference NVGD 1988

6.3.3. WATER SYSTEM

- 6.3.3.1. The size, class, type, and manufacturer of every main shall be shown. The location of the main shall be dimensioned from the centerline of the right-of-way. The center to center length of main installed between valves, fittings, and laterals shall be shown.
- 6.3.3.2. Water mainline shall be the thickest line on plan.
- 6.3.3.3. The location of all fittings (including valves, tees, crosses, reducers, air vents, bends, and lateral taps) shall be dimensioned from/to centerline of each fitting. All fittings shall be suitably labeled for identification.

- 6.3.3.4. Curved lines shall indicate deflected pipe (with curve data provided); lines shall be straight between fittings.
- 6.3.3.5. Show which side of the main the operating nut for butterfly valves is located on.
- 6.3.3.6. A general note on each sheet giving the brand and manufacturer (model, size, etc.) for each valve used shall be provided, with quantities of each clearly tabulated. Services shall include footage and count. Complete information on valve boxes and manhole frames / lids / barrel structure shall be noted.
- 6.3.3.7. All laterals shall be shown giving the length and type of material used. The manufacturer and model of tapping saddle or tee, corporation, curb stop, and box shall be given.
- 6.3.3.8. Contractor to include latitude, longitude and elevation of the location of all:
- 6.3.3.8.1. Valves, tees, crosses, reducers, air vents, bends and lateral taps.
- 6.3.3.8.2. The location shall be tied-in by distance to at least two permanent surface points. These can be manholes, hydrants, other valves, or other suitable points. The point used should be clearly referenced.
- 6.3.3.8.3. Hydrants.
- 6.3.3.8.4. The size and type of every hydrant shall be also shown.
- 6.3.3.8.5. The shutoff valve shall be tied-in to at least two permanent surface points.
- 6.3.3.8.6. All hydrants differing from 6.5' bury shall have the bury depth or length of extensions installed noted.
- 6.3.3.8.7. Elevation of each hydrant tied to the northwest nut of the top flange should be shown.
- 6.3.3.8.8. **Provide depth of cover.**
- 6.3.4. STORM SYSTEM**
- 6.3.4.1. The size and type of all mains and leads shall be shown. Their location relative to the centerline of the right-of-way shall be dimensioned. The total length of sewer installed shall be shown.
- 6.3.4.2. The center-to-center distance between laterals and/or manholes shall be shown.
- 6.3.4.3. GPS coordinates, using State Plane NAD 1927 Wisconsin South coordinate system size, type and manufacturer of all manholes, catch basins, inlets, or outlet sections shall be shown. Material quantities shall be clearly tabulated.
- 6.3.4.4. Elevations of all rims, flow lines, catch basins, gutter inlets, and outlet sections shall be given. Invert elevations shall be given for gutter inlets, catch basins, and manholes. Elevations shall be based on the Village of Germantown datum.
- 6.3.5. ELECTRICAL SYSTEM**
- 6.3.5.1. **The size and type of all conduit and cable shall be shown. Their location relative to the centerline of the right-of-way shall be dimensioned. The total length of electrical infrastructure installed shall be shown.**
- 6.3.5.2. **The center-to-center distance between all electrical structures shall be shown.**
- 6.3.5.3. **GPS coordinates, size, type, and manufacturer of all structures shall be shown. Material quantities shall be clearly tabulated.**
- 6.3.5.4. **Elevations of all rims, pedestals, and other essential infrastructure shall be based on the Village of Germantown datum.**
- 6.3.6. GRADING CERTIFICATION PLAN**
- 6.3.6.1. In preparing a Certification Plan, the Developer's Design Grading Plan shall be shown as screened background.

- 6.3.6.2. Record drawing grades shown on lot lines shall be no less than 0.30 ft. lower than final grades shown on approved master grading plan or higher than 0.10 ft. above the final grades shown on approved master grading plan. The Developer is required to establish final grades within 5 feet of side lot lines, rear lot lines and the front right-of-way area between the front-line lot line and the back of curb in an urban setting or edge of shoulder in a rural setting. These areas shall be described as a “no-touch zone”. All grades within the “no-touch zones” shall be certified by Developer’s Engineer. Developer shall typically show spot grades alongside lot line at front curb, front property corners, front setback, back of house extended, any high points, and rear property corners.
- 6.3.6.3. The grades alongside lot lines are needed even in wooded, ungraded areas.
- 6.3.6.4. Existing house pad grade (elevation taken at the center and each corner of a typical 66’ x 54’ house, except for lots designed for rear exposure house show existing grade at front and back of typical house). House pads are to be left 1.75’ below finish yard grade with a +/- 3” tolerance.
- 6.3.6.5. Elevations every 50 feet along developer graded swales and ditches.
- 6.3.6.6. Elevations every 100-ft. Station along the road alignment. Locations shall include:
- 6.3.6.6.1. Pavement centerline and edges
 - 6.3.6.6.2. Edge of shoulder
 - 6.3.6.6.3. Ditch flowline
 - 6.3.6.6.4. Top of embankment on the backslope of the ditches.
- 6.3.6.7. After analyzing certified grades, Developer shall identify on plan those areas not within above tolerance. Show areas to be regraded, or areas where it may be desirable to revise the proposed grades in the Master Grading Plan.
- 6.3.7. STORM WATER BMP CERTIFICATION PLAN**
- 6.3.7.1. Elevations (minimum of every 50’)
- 6.3.7.1.1. Top of Berm
 - 6.3.7.1.2. Top of Slope
 - 6.3.7.1.3. Toe of Slope
 - 6.3.7.1.4. Safety Shelf Edges
 - 6.3.7.1.5. Bottom of BMP
- 6.3.7.2. Spillway-Top of Slope & Toe of Slope (detailing length, width and height)
- 6.3.7.3. Structure Locations and Elevations
- 6.3.7.3.1. Outfall (invert elevation and size)
 - 6.3.7.3.2. Overflow structures (corners of opening) and Piping (invert elevation and size)
 - 6.3.7.3.3. Inlet Structures (center of manhole) and Piping (invert elevation and size)
 - 6.3.7.3.4. Outlet Structures (center of manhole) and Piping (invert elevation and size)
 - 6.3.7.3.5. Weirs (invert elevation and size)
 - 6.3.7.3.6. Orifice (invert elevation and size)
 - 6.3.7.3.7. Inlet/Outlet (invert elevation and size)
- 6.3.8. EASEMENTS**
- 6.3.8.1. GENERAL
- 6.3.8.1.1. The Developer shall prepare formal written easement documents, including exhibits and written legal description attachments for each easement and record the same with the County Register of Deeds after review and approval by the Village of Germantown for each

easement (Utility, drainage, access, etc.) shown on the subdivision plat (or CSM) as a condition of Final Plat (CSM) approval.

6.3.8.1.2. All ponds are to be in platted outlots.

6.3.8.1.3. No encroachment by structures, berms, trees, shrubs, paved surfaces or changes in grade greater than 4" are allowed in easement areas without approval of the Village Engineer.

6.3.8.1.4. 20-ft. wide minimum width for a single utility. The utility shall be located in the center of the final easement based on record drawing. Easement width may be increased to 50 feet based on pipe size and depth.

6.3.8.1.5. Easements with multiple utilities, the minimum separation from outside of the utility to the easement line shall not be less than 10 feet subject to approval by the Village Engineer. Add not less than 10 feet per additional utility in the easement.

6.3.8.1.6. Maximum ground slope along easements:

A. transverse: 25%

B. longitudinal: 10%.

6.3.9. STORM SYSTEM

6.3.9.1. The Village requires public storm sewer and/or drainage easements for any storm water conveyance system that drains public ROW areas or neighboring off-site areas.

6.3.9.2. A storm sewer running along the rear lot lines within a subdivision, specifically to drain backyards, does not warrant a public easement. The Village considers this to be a private system built for the lot owners of the subdivision and owned/maintained by the property owners.

TABLE OF CONTENTS

7 SURVEYING STANDARDS	111
7.1 GENERAL	111
7.2 HORIZONTAL & VERTICAL CONTROL	111
7.3 CONSTRUCTION STAKING	112
7.4 MONUMENTS	113
7.5 PLATTING	113

7. SURVEYING STANDARDS

7.1. GENERAL

7.1.1. Surveys shall conform to the provisions of Chapter 236 of the Wisconsin Statutes, A-E7 of the Wisconsin Administration Code and all applicable ordinances of the Village of Germantown.

7.2. HORIZONTAL AND VERTICAL CONTROL

7.2.1. Horizontal and vertical control shall be maintained throughout the entire project area from the staking of rough grading to final restoration.

7.2.2. Horizontal and vertical control points shall be clearly marked and protected (i.e. lath) during construction.

- 7.2.3. Second order precision shall be required for vertical control, and the following formula will be used in determining the second order of precision. $E = 0.035 \div M$; where E = error and M = length of the line in miles.
- 7.2.4. Vertical control points shall be established at least every 800 feet and within 100 feet of any improvement proposed. These control points will be established in accordance with Section 1.1.6, 1.1.7, and 1.1.8 of these Standards.
- 7.2.5. When plans are submitted for approval to the Village Engineer, the Project Engineer will also at this time submit a list of all permanent benchmarks, all temporary benchmarks, a description of their location and the basis or origin of the vertical control network and the error of closure for the entire network. This section shall be complied with before the Village of Germantown will schedule inspections.
- 7.2.6. All benchmarks shall be run in from one of the following; listed in priority order.
- 7.2.7. A U. S. Coastal and Geodetic survey monument.
- 7.2.8. A National Geodetic Survey monument.
- 7.2.9. A U. S. Public land survey monument and its accompanying reference benchmark.
- 7.2.10. Permanent benchmarks shall be set only on the following objects:
- 7.2.10.1. Concrete door stoops.
- 7.2.10.2. Concrete headwalls.
- 7.2.10.3. Existing permanent manhole rim (note: manhole shall not be in the general construction area, nor is it to be affected in any way by the project construction).
- 7.2.11. Fire hydrants on marked flange bolt.
- 7.2.12. Temporary benchmarks may be set in the following objects.
- 7.2.13. Power poles.
- 7.2.14. Trees 12 inches in diameter or greater.
- 7.2.15. The error in latitude and departure closure for horizontal traverses shall be no greater than the ratio of one in 10,000 (1:10,000).

7.3. CONSTRUCTION STAKING

- 7.3.1. Roadways shall be staked for subgrade and for final gravel grade and meet the following conditions:
- 7.3.2. Stakes shall be set along the centerline of the roadway, or approved offset.
- 7.3.3. Stakes shall be set at 50-foot intervals.
- 7.3.4. Stakes shall be set for vertical curves at a maximum of 50-foot intervals.
- 7.3.5. Stakes shall be set for horizontal curves having a degree of curve greater than 30° at a maximum of 50-foot intervals.
- 7.3.6. Stakes shall be set at points of curvature, points of tangency, and all low/high points on vertical curves.
- 7.3.7. Lath shall be set next to all roadway stakes and shall have the station labeled with indelible magic marker. Labeling shall indicate station and offsets, in addition to coordinate points.
- 7.3.8. Staking for curb and gutter will be done on a minimum three (3) foot off back of curb with cut/fill to the top of curb.
- 7.3.9. Staking for sanitary sewer/watermain shall be centerline type or on an offset as requested by the contractor and approved by the Village Engineer.
- 7.3.10. Staking for sanitary sewer/watermain shall be done every fifty (50) feet along the pipe centerline or agreed to interval between the Village and contractor.
- 7.3.11. Manholes shall have stakes at the following locations:
- 7.3.11.1. Centerline of manhole.

7.3.11.2. Offset (determined by contractor and approved by the Village Engineer—minimum 10-foot).

7.3.11.3. Straddle point.

7.3.12. Catch basins, and hydrants shall have an offset stake (minimum offset 5-foot).

7.4. MONUMENTS

7.4.1. Lot corner monuments (i.e. iron pipe, rebar) shall be pounded flush with existing ground, thus conforming with Wisconsin Statute 236.15 (1).

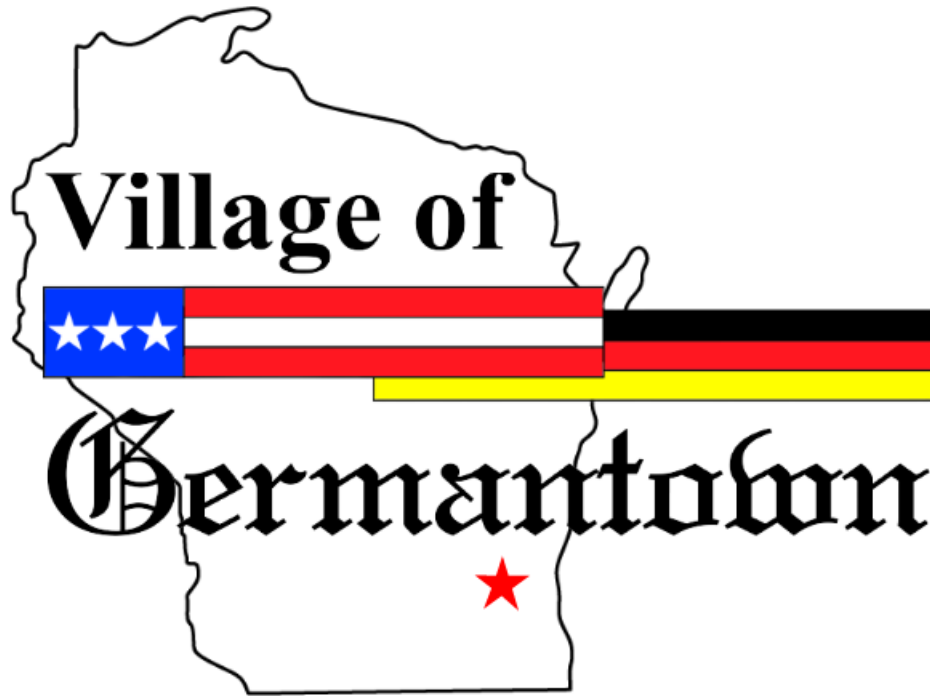
7.4.2. All 1-inch iron pipe or iron rebar to be used to monument a lot corner it shall include a plastic or aluminum survey cap on top which bears the project surveyor's state registration number. Both types of monuments are to conform to the current minimum length and weight requirements

7.4.3. A subdivision corner which is also a U.S. Public Land Survey corner shall be monumented using the following type of monument in the specified area:

7.4.4. 6-inch x 6-inch concrete monument with 4-inch brass cap Monuments will be supplied by the Washington County Surveyor. The County Surveyor shall be notified in writing of any USPLSS corners that will be disturbed by construction 30 days prior to the start of construction. This is a Wisconsin Statutory requirement. Replacement monuments will then be installed by the County Surveyor and/or the Village of Germantown. This will be done at the Developer's expense.

7.5. PLATTING

7.5.1. Final subdivision plats will be signed by the Village once all construction has been completed and accepted, all punch list items resolved, all record drawings have been submitted and approved and all boundary markers have been set in conformance



DEVELOPMENT HANDBOOK

VILLAGE OF GERMANTOWN INFRASTRUCTURE STANDARDS

Approved by:

Public Works & Highway Committee – DATE

Village Board – DATE

TABLE OF CONTENTS

1	CONSTRUCTION PLAN REQUIREMENTS	7
1.1	GENERAL SPECIFICATIONS.....	7
1.1.1	Sheet Requirements	7
1.2	PLAN REVIEW	8
1.2.1	Detail Sheet	8
1.2.2	Plan View	9
1.2.3	Profile View	9
1.3	MASTER GRADING & DRAINAGE PLANS.....	9
1.3.1	General	9
1.3.2	Plan View shall show the following:	9
1.3.3	Grading Record Drawing	11
1.4	EROSION CONTROL PLAN.....	11
1.4.1	General	11
1.4.2	Plan View shall show the following:	11
1.4.3	Proposed conditions of the site shall include:.....	12
1.5	STORM WATER MANAGEMENT PLAN.....	12
1.5.1	General	12
1.5.2	Plan View	13
1.6	STORM SEWER PLANS	13
1.6.1	Plan View	13
1.6.2	Profile view	14
1.7	SANITARY SEWER & WATER MAIN PLANS	14
1.7.1	General	14
1.7.2	Plan View	15
1.7.3	Profile View	16
1.8	ROADWAY PLANS.....	16
1.8.1	General	16
1.8.2	Plan View	16
1.8.3	Profile View	17
1.9	PRELIMINARY PLAT	18
1.9.1	General	18
1.10	FINAL PLAT	18
1.10.1	General	18
1.11	PLAN SET SUBMITTAL SCHEDULE.....	18
1.11.1	Village of Germantown Submittals.....	18
1.11.2	Sanitary Sewer Plan Submittal to MMSD/DNR.....	18
1.11.3	Water main Plan Submittal to DNR	19
1.11.4	Storm Sewer Submittal to MMSD	19
1.11.5	Storm Water Management Plan Submittal to MMSD/DNR	19

2	WATER SYSTEM	20
2.1	<i>SPECIFICATIONS</i>	20
2.1.1	Water Main Pipe	20
2.1.2	Water Services	21
2.1.3	Trench Check Dam	23
2.1.4	Valves	24
2.1.5	Valve Boxes	25
2.1.6	Valve Vaults	26
2.1.7	Hydrants	27
2.1.8	Fittings	29
2.1.9	Water Metering Requirements	30
2.1.10	Polyethylene Wrap	32
2.1.11	Tracer Wire	32
2.1.12	Tapping	33
2.1.13	Bedding, Cover, & Backfill	35
2.1.14	Caps & Plugs	36
2.1.15	Casing/Carrier Pipe	36
2.2	<i>ABANDONMENT</i>	37
2.2.1	General	37
2.2.2	Water Services	38
2.3	<i>INSPECTION</i>	38
2.3.1	Submittals & Samples	38
2.3.2	Disinfecting	39
2.3.3	Acceptance Testing	39
2.4	<i>OTHER REQUIREMENTS</i>	41
2.4.1	General	41
3	SANITARY SEWER SYSTEM	43
3.1	<i>SPECIFICATIONS</i>	43
3.1.1	Sanitary Sewer Main and Laterals	43
3.1.2	Sanitary Force Main	45
3.1.3	Tracer Wire	46
3.1.4	Bedding, Cover, and Backfill	47
3.1.5	Sanitary Manholes	48
3.1.6	Sanitary Sewer Laterals	52
3.1.7	Lateral Connections	53
3.1.8	Casing Pipe	54
3.1.9	Trench Check Dam	55
3.1.10	Polyethylene Wrap and Corrosion Protection	55
3.1.11	Grease Interceptors	55
3.1.12	Lift Stations	57
3.1.13	Insulation	57
3.2	<i>ABANDONMENT</i>	57
3.2.1	GENERAL	57
3.2.2	SANITARY SEWER	58
3.3	<i>INSPECTION</i>	72

3.3.1	SUBMITTALS AND SAMPLES	72
3.3.2	ACCEPTANCE TESTING	72
3.3.3	CLEANING	73
3.3.4	CCTV – Private Interceptor Sewers.....	74
4	STORM SEWER SYSTEM	59
4.1	<i>SPECIFICATIONS</i>	59
4.1.1	STORM SEWER PIPE.....	59
4.1.2	STORM LATERALS (From main to lot line)	60
4.1.3	CULVERTS	61
4.1.4	FLARED END SECTIONS.....	62
4.1.5	DITCHES	62
4.1.6	STORM MANHOLE & JUNCTION CHAMBERS.....	63
4.1.7	CATCH BASINS	64
4.1.8	FIELD INLETS	65
4.1.9	ROAD UNDERDRAINS	65
4.1.10	BEHIND CURB COLLECTORS.....	66
4.1.11	FRAMES, GRATES AND LIDS.....	67
4.1.12	FRAME ADJUSTMENTS	68
4.1.13	SUMP PUMPS, DOWN SPOUTS, AND ROOF DRAINS	68
4.1.14	BEDDING/COVER/BACKFILL.....	68
4.1.15	PIPE TO MANHOLE CONNECTIONS.....	69
4.2	<i>INSPECTION</i>	70
4.2.1	SUMBITTALS AND SAMPLES	70
4.2.2	ACCEPTANCE TESTING	70
5	ROAD SYSTEM	72
5.1	<i>GEOMETRICS</i>	75
5.1.1	RIGHT-OF-WAY WIDTHS	75
	Per tables 2 & 2A of Chapter 18 of the Village of Germantown Municipal Code	75
5.1.2	PAVEMENT WIDTHS	75
	Per tables 2 & 2A of Chapter 18 of the Village of Germantown Municipal Code	75
5.1.3	BOULEVARD SECTIONS.....	75
5.1.4	CUL-DE-SACS.....	75
5.1.5	CLOSE/LOOP STREET	76
5.1.6	STREET GRADES	76
5.1.7	CROSS SLOPE	76
5.1.8	HORIZONTAL CURVES.....	76
5.1.9	VERTICAL CURVES.....	77
5.1.10	SIGHT DISTANCE	77
5.1.11	INTERSECTION RADII	77
5.1.12	ACCELERATION/DECELERATIONS/BYPASS LANES	77
5.1.13	TRANSITIONS	77
5.2	<i>SPECIFICATIONS</i>	77
5.2.1	SUBGRADE	77
5.2.2	GEOTEXTILE FABRIC.....	78
5.2.3	BASE COURSE	79

5.2.4	FROST BARRIER – As required by the Village Engineer	80
5.2.5	SHOULDERS	80
5.2.6	ASPHALT PAVEMENT	80
5.2.7	CONCRETE PAVEMENT	82
	The use of concrete pavement requires the approval of the Village Engineer.	82
5.2.8	ADMIXTURES	84
5.2.9	CURB AND GUTTER.....	84
5.2.10	ROAD UNDERDRAIN PIPE	86
5.2.11	DRIVEWAYS	86
5.2.12	PARKING LOTS	88
5.2.13	SIDEWALK AND PATHWAYS.....	89
5.3	<i>INSPECTION</i>	90
	Contractor shall be responsible for the horizontal and vertical control.....	90
5.3.1	ACCEPTANCE TESTING	90
5.4	<i>STREET LIGHTING</i>	91
	This section covers lighting for Municipally owned streets, sidewalks, parking lots, and parks. The Municipal Lighting is comprised of Municipally owned and maintained lighting and street lighting owned and maintained by We-energies.....	91
5.4.1	WE-ENERGIES OWNED & MAINTAINED STREET LIGHTING	92
5.4.2	VILLAGE OWNED PUBLIC STREET LIGHTS	92
5.4.3	INSTALLATION	93
5.4.4	INSPECTION/APPROVAL	93
6	Project Close-Out	94
6.1	<i>CONSTRUCTION INSPECTOR BINDER</i>	94
6.1.1	General	94
6.2	<i>LIEN WAIVERS</i>	94
6.2.1	General	94
6.3	<i>RECORD DRAWINGS</i>	94
6.3.1	GENERAL.....	94
6.3.2	SANITARY SYSTEM	95
6.3.3	WATER SYSTEM	96
6.3.4	STORM SYSTEM	97
6.3.5	ELECTRICAL SYSTEM	97
6.3.6	GRADING CERTIFICATION PLAN	98
6.3.7	STORM WATER BMP CERTIFICATION PLAN.....	98
6.3.8	EASEMENTS	99
6.3.9	STORM SYSTEM	99
7	Surveying Standards.....	101
7.1	<i>GENERAL</i>	101
7.1.1	General	101
7.2	<i>HORIZONTAL AND VERTICAL CONTROL</i>	101
7.2.1	General	101
7.3	<i>CONSTRUCTION STAKING</i>	102

7.3.1	General	102
7.4	<i>MONUMENTS</i>	102
7.4.1	General	102
7.5	<i>PLATTING</i>	103
7.5.1	General	103

1 CONSTRUCTION PLAN REQUIREMENTS

1.1 GENERAL SPECIFICATIONS

1.1.1 Sheet Requirements

1.1.1.1 Plans submitted for approval shall be on "D" size paper, 24-inches x 36-inches. The only exception is the master grading plan. The master grading plan shall not exceed a size of 30-inches x 36-inches and shall show the entire development if possible. If additional sheets are required match lines shall be used. Plans may be submitted electronically on a flash drive or through a file sharing program and/or on 11-inch x 17-inch paper if approved by Director of Public Works. If submitted electronically, the drawings shall be a .pdf file type.

1.1.1.2 Plans shall be drawn to a recognized Engineering scale, i.e.: 1"= 40' or 1" = 50' horizontal and 1" = 4', 1" = 5' vertical.

1.1.1.3 Plans shall use local datum (NVGD 1988 datum) in establishing benchmarks and elevations.

1.1.1.4 Title blocks are required on each plan page and shall include all of the following fields:

1.1.1.4.1 Consulting Firm and Contact Information

1.1.1.4.2 Drawn By

1.1.1.4.3 Designed By

1.1.1.4.4 Checked By

1.1.1.4.5 Date

1.1.1.4.6 Scale

1.1.1.4.7 Revision History

1.1.1.4.8 Project Name

1.1.1.4.9 Project Location

1.1.1.4.10 Plan Sheet Type

1.1.1.4.11 Sheet Number

1.1.1.5 Stationing shall be at 100-foot intervals from South to North or West to East and shall be indicated on plan and profiles. Every 100-foot station shall be noted.

1.1.1.6 Each set of plans, drawings, documents, specifications, and reports shall be signed, dated, and stamped by a registered Professional Engineer in the State of Wisconsin, according to the Wisconsin Administrative Code Chapter A-E 2(4). The design Engineer shall bear the responsibility for the coordination of submitting all development plans for review. Any plans that are submitted without a professional seal will be rejected.

- 1.1.1.7 A cover sheet is required for the plan set. The cover sheet shall include a 1" =200' scale drawing of the project area that shows the locations of the proposed improvements. Plan sheets shall be indexed on this 200-scale system plan. NAD83 and NAVD88 are to be used.
- 1.1.1.8 Each cover sheet shall show the locations, elevations, and descriptions of the project benchmarks as established by the project surveyor. The cover sheet shall also show a location map with township, range, and section labeled.
- 1.1.1.9 Profile view shall be located below the plan view on plan/profile drawings and the two views should be in alignment vertically.
- 1.1.1.10 Each plan sheet shall show a north arrow. North direction shall be to the top or to the right of the sheet and indicated by a north arrow.
- 1.1.1.11 A legend shall be included in the plan set to designate line types.
- 1.1.1.12 Four (4) sets of all preliminary plans and specifications shall be submitted for initial review and corrections. Plans and support documents (i.e. stormwater management report, maintenance agreement, etc.) requiring state approval from MMSD and DNR, shall be processed through the Village. After Village review and approval, the documents will be sent to the appropriate state agencies by the Village Engineer.
- 1.1.1.13 Two full size and two half size sets of approved complete construction plans and specifications which meet all the requirements shall be submitted to the Village at least three working days prior to the preconstruction meeting. The preconstruction meeting is to be overseen by the Director of Public Works or their designee. Failure to submit plans and specs within the required time frame will result in the cancellation of the preconstruction meeting. These construction plans shall include but not be limited to the following:

1.2 PLAN REVIEW

1.2.1 Detail Sheet

- 1.2.1.1 A minimum of five (5) working days shall be required for approval of any revisions or changes to previously approved plans. The approval shall be in writing from the Village Engineer. No construction related to these proposed revisions or changes shall proceed prior to the approval of such revisions.
- 1.2.1.2 Preliminary proposed and existing grading plans (with plan view of preliminary sanitary sewer) shall be reviewed prior to all other preliminary construction plans being submitted. Complete detail and calculations for detention/retention objectives should be shown.
- 1.2.1.3 Digger's Hotline number of 1-800-242-8511 shall be noted on the plan set.
- 1.2.1.4 All requirements of the Village of Germantown Municipal Code, the DNR, and MMSD shall be met.

1.2.1.5 A construction estimate including materials, quantities, and cost will be included with the plans for water, sanitary, roadway, storm water, and grading.

1.2.1.6 A copy of the approved plans shall be submitted to the Village on CD in AutoCAD v2020.

1.2.2 Plan View

1.2.2.1 Lot, block, street, property, ¼ section, and easement line shall be shown.

1.2.2.2 Lot and block numbers, subdivision name, and existing physical features shall be shown.

1.2.2.3 Lot or property frontage, street width and easement dimensions shall be indicated.

1.2.2.4 Street names shall be shown.

1.2.2.5 Street centerline shall be indicated.

1.2.2.6 Match lines shall be shown to next plan sheet.

1.2.2.7 Dimensions showing offset from right-of-way and proposed roadway or easement centerline to proposed utility alignment.

1.2.3 Profile View

1.2.3.1 Elevations shall be based on the Village of Germantown datum (NAVD88) and given to the nearest 0.01 of a foot. Benchmarks used shall be indicated on the plans.

1.2.3.2 Conversion factor to Milwaukee Metropolitan Sewerage District datum shall be shown on the plans. (-580.61')

1.2.3.3 Signage Plan

1.2.3.4 Sign types, locations, and regulations to be listed and clearly stated.

1.3 MASTER GRADING & DRAINAGE PLANS

1.3.1 General

1.3.1.1 Scale of the plans shall be 1" = 100' for the master plan and 1" = 40' for the individual plan sheets.

1.3.1.2 A note shall be prominently placed on each sheet of the Master Grading Plan indicating "The Village of Germantown shall not approve any grade change in excess of 0.25 feet unless authorized to do so by the Village Engineer."

1.3.2 Plan View shall show the following:

1.3.2.1 Subdivision boundary lines and all lot lines.

1.3.2.2 Adjoining and inclusive roadways and their names.

- 1.3.2.3 Contour lines at 2-foot intervals. These contour lines shall extend at least 100 feet into adjacent parcels. Contours shall show all offsite drainage that is tributary to the site. Existing contour lines shall be dashed while proposed contour lines shall be solid, with the 10-foot increments in boldface.
- 1.3.2.4 Existing and proposed culvert locations, invert elevations, sizes, and materials on and within 200 feet of the proposed development.
- 1.3.2.5 Existing and proposed storm sewer locations, invert elevations, sizes, and materials on and within 200 feet of the proposed development, including catch basins, manholes, inlets, and BMP's.
- 1.3.2.6 Location of existing trees with Diameter at Breast Height (DABH) and type.
- 1.3.2.7 Location of proposed topsoil stockpile.
- 1.3.2.8 Proposed building pad locations and finished floor elevation for each lot, which incorporate setbacks and offsets and show finished yard grade, and exposure grade, if applicable, elevations to the nearest tenth of a foot. If it is desirable to maintain post grading/pre-building construction yard grades low, to not exceed 1.5 feet, it shall be noted prominently on plan.
- 1.3.2.9 Proposed elevations at all property corners.
- 1.3.2.10 Show all high points, low points, and overland drainage paths with elevations.
- 1.3.2.11 Notes required to sequence the construction activities (i.e. erosion and grading notes and plans which shall be done ahead of other operations on site to manage storm water runoff).
- 1.3.2.12 Specific details on all retention/detention basins, ponds, overflows, outlet structures, etc.
- 1.3.2.13 Obstructions within the project limits including but not limited to: trees, landscaping, fences, structures, light poles, etc.
- 1.3.2.14 Finished street centerline elevations shall be indicated at 100-foot stations, all intersections, cul-de-sacs, and other changes in slope. At vertical curves, elevations shall be shown at P.V.C., P.O.C., P.V.T. and at 25-foot intervals for curves 100 feet long or less. For vertical curves over 100 feet long, elevations at 50-foot intervals along the V.C., plus the P.O.C. and P.V.I.
- 1.3.2.15 Channel or swale flow-line elevations shall be indicated every 25 feet within public land or easement.
- 1.3.2.16 Arrows indicating path and direction of sheet flow shall be shown for each proposed lot.
- 1.3.2.17 Mapped wetland boundaries and 100-year floodplain shall be delineated along with setbacks.

1.3.2.18 Overflow discharge and overland flow path.

1.3.3 Grading Record Drawing

1.3.3.1 After finished grading is accomplished, a grading record drawing shall be created and submitted to verify conformance with the approved grading plan. The drawing shall consist of the following:

1.3.3.1.1 Use approved grading plan as the base sheet. Denote “record drawing” in bold letters at the top and specify the firm doing the record. Cross out the name of the design firm if different than the firm doing record drawings. Drawings should denote a Record Drawing (As-Built) Date.

1.3.3.1.2 Spot elevations in the center of all lot building pads to the nearest tenth of a foot.

1.3.3.1.3 Spot elevations at all property corners to the nearest tenth of a foot.

1.3.3.1.4 Crossroad culvert invert elevations to the nearest hundredth of a foot.

1.3.3.1.5 Flowline ditch elevations at every even station to the nearest tenth of a foot.

1.3.3.1.6 Berm elevations to the nearest tenth of a foot.

1.3.3.1.7 Spot elevations at all high and low points to the nearest tenth of a foot.

1.3.3.1.8 Verify topo lines as directed by the Village Engineer.

1.3.3.1.9 Field inlet grate elevations.

1.4 EROSION CONTROL PLAN

1.4.1 General

1.4.1.1 Plans shall conform to Chapter 17 Zoning Code, Section 17.44 Erosion Control of the Municipal Code.

1.4.1.2 Plans shall conform to The Wisconsin Stormwater Manual and the Wisconsin Construction Site Best Management Practice Handbook.

1.4.1.3 In certain instances, it is accepted to combine the grading and drainage plan with the erosion control plan, as long as all required items are discernible.

1.4.2 Plan View shall show the following:

1.4.2.1 Site boundaries and adjacent lands.

1.4.2.2 Vegetative cover and soil type.

1.4.2.3 The limits of any areas which need special stabilization techniques.

1.4.2.4 Mapped wetland boundaries, 100-year floodplain, and watercourses shall be delineated along with setbacks.

1.4.2.5 Location and dimensions of storm water drainage systems and natural drainage patterns on and immediately adjacent to the site for 200 feet.

1.4.2.6 Locations and dimensions of existing; utilities, structures, roads, highways, paving, lot lines and outlots.

1.4.3 Proposed conditions of the site shall include:

1.4.3.1 Locations and dimensions of all proposed land disturbing activities, including finished topography.

1.4.3.2 Location and dimensions of all temporary soil and dirt stockpiles with erosion control method.

1.4.3.3 Location and dimensions of all construction site sediment and erosion control measures necessary. From the WI Construction Site Handbook, best management practices include the following categories: diverting flow, managing overland flow, trapping sediment in channelized flow, establishing permanent drainageways, protecting inlet trapping sediment during site dewatering, preventing tracking, and others. Construction details should be shown on the plan.

1.4.3.4 Location, dimensions and description of all channels, pipes, structures, basins or reservoirs, or other conveyances proposed to carry runoff to the nearest adequate outlet, including applicable design assumptions and computations. The application, design discharge rate, in cubic feet per second, for each structure, pipe, channel, or conveyance. Design flow velocity for channels and outlets shall be indicated.

1.4.3.5 Areas to be sodded or seeded and mulched or otherwise, stabilized with vegetation, describing type of final vegetative cover. Type and quality of mulch and method of anchoring shall be indicated, as well as seeding mixtures, rates, lime and fertilizer application rate for temporary or permanent seeding.

1.4.3.6 Schedule of anticipated starting and completion date of each land disturbing and land developing activity including the installation of construction site control measures.

1.4.3.7 Provisions for maintenance of the construction site control measures during construction.

1.4.3.8 Completion of weekly DNR form for maintenance of erosion control as required in permit.

1.5 STORM WATER MANAGEMENT PLAN

1.5.1 General

1.5.1.1 MMSD Rules and Regulations Chapter 13 shall be followed for developments that involve an increase of one-half acre or more of impervious surface.

1.5.1.2 DNR Chapters NR 151 and NR 216 shall be followed for construction sites with 1 acre or more of land disturbance.

1.5.1.3 The Village's Storm Water Management Guidelines shall be followed for developments with > 3,000 SF of land disturbance.

1.5.2 Plan View

1.5.2.1 Highlight drainage basins and specify acres of each basin for existing and proposed conditions. Show contours to determine accuracy of constructed basin.

1.5.2.2 Show time of concentration paths including lengths and slopes.

1.5.2.3 Indicate soil groups and curve numbers.

1.5.2.4 Show detention basin volumes, high water level (HWL), overflow location and elevation. Indicate basins with a title to be referenced by details and in the report.

1.5.2.5 Provide detail of basin discharge structure, size, and materials, showing the 2-yr and 100-yr elevations and restrictions.

1.5.2.6 Existing and proposed contours in pond area at one-foot contour interval.

1.5.2.7 Flood routing for runoff greater than design capacity.

1.5.2.8 Flood stage elevation of 100-year 24 hour storm event.

1.5.2.9 Accompanying the plan shall be a signed and sealed Detailed Storm Water Management Report including a narrative, design assumptions, conclusions, calculations, and recommendations.

1.6 STORM SEWER PLANS

1.6.1 Plan View

1.6.1.1 Right-of-way and its width.

1.6.1.2 Lot lines, lot and block numbers, frontages, and house addresses.

1.6.1.3 Name of each roadway and any intersecting roadways in which the storm sewer will be located.

1.6.1.4 Edge of pavement or face and back of curb and sidewalk.

1.6.1.5 All easement limits and widths, including existing and proposed, permanent and temporary.

1.6.1.6 All proposed and existing sanitary sewer and laterals (existing-dashed, proposed-solid).

1.6.1.7 All proposed and existing water main and laterals (existing-dashed, proposed-solid).

1.6.1.8 Proposed size and diameter of manholes, catch basins, inlets, and junction boxes.

1.6.1.9 Inlets at intersections shall be located at the end of the curb and gutter radius and not in pedestrian walkways.

1.6.1.10 Dimensions showing offset from right-of-way and roadway centerline to the storm sewer. Typically, the storm sewer should be located 10 feet south or west of roadway centerline.

1.6.1.11 Length and diameter of storm sewer between structures, from center to center of manholes, and other structures shall be dimensioned.

1.6.1.12 Material and size of any existing storm sewer to be tied into.

1.6.1.13 Details of outfall or ditch inlet protection requirements such as riprap, end sections or headwalls as needed.

1.6.1.14 Additional details shall include typical manholes, catch basins, inlets, etc.

1.6.1.15 Location of sump pump collection system, field drains, and drainage tiles, as well as construction elevations and details.

1.6.1.16 All obstructions/appurtenances located within the project limits, including, but not limited to: trees, signs, utilities, fences, light poles, structures, etc.

1.6.1.17 A note shall be included that states storm sewer construction shall be according to the latest addition of the Standard Specifications for Sewer and Water construction in Wisconsin and Village of Germantown Construction Standards and Specifications. Germantown's municipal code and standard specifications supersede other standard specifications, when there are conflicting requirements.

1.6.2 Profile view

1.6.2.1 Existing and proposed surface profiles over the storm sewer.

1.6.2.2 The proposed size, material, and diameter of manholes, catch basins, inlets, culverts, and junction boxes.

1.6.2.3 Distances, slope, size, and material of storm sewer shall be labeled between structures center to center.

1.6.2.4 Rim and invert elevations at structures.

1.6.2.5 Invert of storm sewer pipe if different than structure invert elevation.

1.6.2.6 Material and size of any existing storm sewer to be tied into.

1.6.2.7 Sanitary sewer (dashed).

1.6.2.8 Water main (dashed).

1.6.2.9 Backfill material to be used shall be labeled and compacted according to designated methods as approved by the Village Engineer.

1.7 SANITARY SEWER & WATER MAIN PLANS

1.7.1 General

1.7.1.1 Sanitary sewer and water main may be shown on the same sheet as approved by Village Engineer.

1.7.1.2 Plans shall state that construction shall be according to Standard Specifications for Sewer and Water Construction in Wisconsin, and the Construction Standards and Specifications of the Village of Germantown.

1.7.1.3 All sanitary sewer drawings shall include a Lateral Table. The table must show all lengths of sanitary sewer laterals and confirm clearance underneath future footing elevations.

1.7.2 Plan View

1.7.2.1 Right-of-way and its width.

1.7.2.2 Lot lines, lot and block numbers, frontages, and addresses.

1.7.2.3 Edge of pavement or face and back of curb and sidewalk where applicable.

1.7.2.4 All easement limits and widths; easements shall be a minimum of 20 feet wide.

1.7.2.5 Proposed water main pipe material, diameter, hydrant, valve and lateral locations. (existing-dashed, proposed-solid).

1.7.2.6 Existing water facilities on, or adjacent to, the development. This shall include material and size of any existing water main.

1.7.2.7 Proposed sanitary sewer manholes, pipe slopes and center-to-center distances between manholes, pipe diameter, laterals, and rim and invert elevations. (existing-dashed, proposed-solid).

1.7.2.8 Existing sanitary facilities on, or adjacent to, the development. This shall include material and size of any existing sewer.

1.7.2.9 Sanitary sewers shall generally be located at the centerline of the street. Water mains shall be located 10 feet to the north or east of centerline of the street and shall maintain all necessary clearances as defined by standard specifications.

1.7.2.10 Dimensions showing offset from right-of-way to the sewer line and water line. Dimensions shall also show the separation between the sanitary sewer, water main, and other utilities.

1.7.2.11 Length of each sanitary sewer lateral and length of any lateral risers, as measured from the centerline of the mainline.

1.7.2.12 Elevations of sewer and water shall refer to flowline or invert of pipe.

1.7.2.13 Name of each roadway and any intersecting roadways in which the sanitary sewer will be located.

1.7.2.14 All manholes, valves, and hydrants should be labeled.

1.7.2.15 Proposed or existing storm sewer and appurtenances (existing-dashed, proposed-solid).

1.7.2.16 All improvements are to use roadway stationing.

1.7.2.17 All obstructions/appurtenances located within the project limits including but not limited to trees, signs, utilities, fences, light poles, structures, etc.

1.7.3 Profile View

1.7.3.1 Existing and proposed surface profiles over the sanitary sewer and water main.

1.7.3.2 The proposed label, diameter, rim and invert elevations of sanitary sewer manholes (inches) for existing and proposed.

1.7.3.3 Invert of sanitary sewer pipe if different than structure invert elevation.

1.7.3.4 Pipe material, slope and diameter of sanitary sewer between each manhole as plus or minus foot per foot.

1.7.3.5 Center-to-center distance between manholes.

1.7.3.6 The proposed water main pipe material and its diameter.

1.7.3.7 Center of hydrant nozzle, and hydrant shoe elevations shall be indicated.

1.7.3.8 Limits of gravel, spoil, and/or slurry backfill.

1.7.3.9 Proposed or existing storm sewer and appurtenances (existing-dashed, proposed-solid).

1.7.3.10 Crossings with existing or proposed underground improvements shall be drawn with the name, diameter, elevation and station indicated.

1.7.3.11 Material and size of any existing sanitary sewer and water main to be tied into.

1.7.3.12 Stationing shall be done for all appurtenances.

1.7.3.13 Areas of concrete cradle and envelope shall be dimensioned and labeled.

1.8 ROADWAY PLANS

1.8.1 General

1.8.1.1 Both typical sections and cross-sections shall be shown on the Plan and Detail sheets. Cross-sections details shall also be shown for a cul-de-sacs and t-turnarounds.

1.8.1.2 Elevations shall refer to finished centerline grade.

1.8.1.3 Plans shall state that paving construction shall be according to WIS DOT Standard Specifications for Road and Bridge Construction, latest edition. Germantown's municipal code and specifications supersede if there is any conflict.

1.8.2 Plan View

1.8.2.1 Right-of-way and its width.

1.8.2.2 Edge of pavement face and back of curb and sidewalk.

1.8.2.3 Stationing along the centerline of the roadway, including cul-de-sacs and t-turnarounds.

1.8.2.4 Stations shall be indicated by tick marks along the centerline and every 100-foot station shall be labeled.

1.8.2.5 Width of pavement flange to flange.

1.8.2.6 Lot lines, numbers, frontage lengths, and house addresses.

1.8.2.7 Name of each roadway and any adjoining roadways.

1.8.2.8 Curb radii shall be dimensioned to the back of curb. Curb radii are to be verified and approved by the Village Engineer.

1.8.2.9 Flange lines and back-of-curb lines shall be drawn.

1.8.2.10 Flange elevations shall be shown at the beginning, end, and change of slope, at all curb and gutter sections, cul-de-sacs, and warped pavement sections. Length of curve and slope shall also be shown.

1.8.2.11 Specific details of all existing roadways being connected to. Pavement, shoulders, ditches, curb alignment and grades shall be shown as needed to adequately make the transition to match existing grades.

1.8.2.12 All driveways within 500 feet of the proposed development.

1.8.2.13 All roadside ditch locations, flow line elevations at 100-foot intervals, and slope of the ditch.

1.8.2.14 All obstructions/appurtenances located within the project limits including but not limited to: trees, signs, utilities, fences, light poles, structures, etc.

1.8.3 Profile View

1.8.3.1 Existing and proposed roadway profiles along centerline of roadway, cul-de-sacs, and t-turnarounds.

1.8.3.2 Stationing and final centerline grades at all fifty- and hundred-foot stations and at all grade breaks.

1.8.3.3 Proposed grades and stationing shall be shown at each station, at intersections, at street lines extended and at 25-foot intervals, P.C., P.T., and P.I., of vertical and horizontal curves.

1.8.3.4 Slopes shall be indicated as plus or minus foot per foot.

1.9 PRELIMINARY PLAT

1.9.1 General

1.9.1.1 Two (2) copies of a preliminary plat shall be submitted with the other required preliminary plans for initial review.

1.9.1.2 Three (3) copies of an approved, recorded preliminary plat conforming to Section 236.11 (1)(a) of the Wisconsin Statutes shall be required at least one month prior to the start of any construction.

1.10 FINAL PLAT

1.10.1 General

1.10.1.1 The final plat will not be certified by the Village until conditions of the development agreement are met.

1.10.1.2 One (1) full size 24" x 36" and one (1) 8½"x11" 200 scale copy of the final plat conforming to Section 236.25 (2)(c) and (d) of the Wisconsin Statutes shall be submitted to the Village within 10 days of recording. A digital file compatible with AutoCAD in .DWG format shall also be submitted.

1.10.1.3 The AutoCAD digital plat will be mapped using the Wisconsin State Plane Coordinate System – South Zone and based on the NAD83. All construction plans and record documents will be based on this same survey requirement. The coordinates of all section and quarter section monuments are available from the Village Engineering Department.

1.11 PLAN SET SUBMITTAL SCHEDULE

1.11.1 Village of Germantown Submittals

1.11.1.1 When submitting plans to the Village for: sanitary sewer, water main, storm sewer, paving, grading, and erosion control, provide the following number of plan sets:

1.11.1.1.1 For the FIRST submittal, the plans shall go through the Village Planner and receive Village board approval. Their requirements shall be followed. Please provide four (4) copies of the plans in digital form and 24-inch x 36-inch plan sets.

1.11.1.1.2 For each SUBSEQUENT submittal after approval by Village Board, two (2) copies of each plan set.

1.11.1.1.3 For the FINAL submittal, two (2) copies of each plan set.

1.11.1.2 The Village shall be copied on all correspondence to and from governing agencies including MMSD, DNR, Army Corps of Engineers (ACOE).

1.11.2 Sanitary Sewer Plan Submittal to MMSD/DNR

1.11.2.1 Sanitary Sewer submittals shall follow the requirements of NR 110 and all other chapters, along with MMSD Chapter 2. Projects eligible for DNR 'Fast-Track' – as designated on DNR's website. This information is located on Form 3400-160.

1.11.2.2 Any additional data or documents required by MMSD or DNR shall be furnished by the consulting Engineer.

1.11.3 Water main Plan Submittal to DNR

1.11.3.1 Water Main Extensions shall follow the requirements of NR 811 and all other applicable chapters.

1.11.3.1.1 One copy of the cover letter/Village approval letter.

1.11.3.1.2 One set of plans and specifications.

1.11.3.1.3 Form 3400-105 Acknowledgement of Receipt by DNR

1.11.3.1.4 Form 3300-66 Water Main Submittal Checklist

1.11.3.2 Any additional data or documents required by MMSD or DNR shall be furnished by the consulting Engineer.

1.11.4 Storm Sewer Submittal to MMSD

1.11.4.1 Storm Sewer shall follow the requirements of Chapter 2.

1.11.4.1.1 One copy of the cover letter/Village approval letter.

1.11.4.1.2 One copy of the plans and specifications.

1.11.4.1.3 One copy of the relevant system plan

1.11.4.1.4 One copy of the design computations.

1.11.5 Storm Water Management Plan Submittal to MMSD/DNR

1.11.5.1 An electronic copy of the Storm Water Management Plan shall be submitted to MMSD via Sharepoint and shall follow the requirements of Chapter 13 and the Surface Water and Storm Water Rules.

1.11.5.2 Construction activities that disturb more than 1 acre of land shall apply for an NOI and an NOT from the DNR and shall follow the requirements of NR 216 and NR 151.

1.11.5.3 Chapter 30 permits and Water Quality permits shall be obtained as required. ACOE permits for work in wetlands shall also be obtained.

2 WATER SYSTEM

All labor and material shall be governed by requirements of the latest edition and all amendments thereto of the Standard Specifications for Sewer and Water Construction in Wisconsin (SWS), Public Service Commission (PSC) Rules, and Wisconsin Department of Natural Resources (WDNR) Regulations, unless otherwise specified in this document, whichever is more restrictive. All products specified in this section shall be manufactured domestically.

2.1 SPECIFICATIONS

2.1.1 Water Main Pipe

2.1.1.1 MATERIALS

2.1.1.1.1 All pipe used for water main shall comply with SWS and the following:

2.1.1.1.1.1 6" PVC – Hydrant leads

2.1.1.1.1.2 8" PVC or Fusible PVC C-900 and/or C90/RJIB Certa-Lok

2.1.1.1.1.3 12" PVC or Fusible PVC C-900 and/or C90/RJIB Certa-Lok

2.1.1.1.1.4 16" PVC or Fusible PVC C-900 and/or C90/RJIB Certa-Lok

2.1.1.1.1.5 Sizing of private mains requires approval by the Village Engineer.

2.1.1.1.2 PVC or PVCO water main for sizes 4" through 16" diameter, excepting service laterals shall conform to the outer diameter (OD) of Ductile Iron pipe and be AWWA C-900 or AWWA C-909, Class 150 or 200, DR-18 or -14. Shall conform to Standard Specifications Ch. 4.6.0 and 8.20.0. All pipe shall be furnished with Push-On type integral elastomeric bell-spigot joints. USA manufactured products only.

2.1.1.1.3 Fire and Combination Fire/Water service lines from the connection at the main to the backflow prevention device connection, shall be:

2.1.1.1.3.1 PVC/PVCO for sizes 3" through 12" diameters only, conforming to the OD of Ductile Iron pipe, AWWA C-900 or AWWA C-909, Class 200, DR-14

2.1.1.1.3.2 All pipe shall be furnished with Push-On type integral elastomeric bell-spigot joints.

2.1.1.2 DESIGN STANDARDS

2.1.1.2.1 Main sizes (Minimum).

2.1.1.2.1.1 Residential: 8" minimum

2.1.1.2.1.2 Multifamily and commercial: 12" subject to Village Engineer approval.

2.1.1.2.1.3 Industrial: 12" subject to Village Engineer approval.

2.1.1.2.2 Watermain Location

2.1.1.2.2.1 In streets & easements: 10 feet from sanitary sewer; north and east.

2.1.1.2.3 Watermain Bury Depth/Pipe Design Cover

2.1.1.2.3.1 Turf – 6.5 feet (below final grade);

2.1.1.2.3.2 Paved Areas - 7 feet minimum

2.1.1.2.3.3 Special situations (i.e.: ditches, etc.)- 5 feet minimum cover with insulation.

2.1.1.2.3.4 Under 4 feet of cover water main shall be offset to achieve 6 foot cover.

2.1.1.2.4 Tracer wire installation is required on all water mains, branches, and services.

2.1.2 Water Services

2.1.2.1 MATERIALS

2.1.2.1.1 Sizes thru 2" diameter shall be of one manufacturer only, as follows:

2.1.2.1.1.1 Service Lines

2.1.2.1.1.2 PVC

2.1.2.1.1.3 Crosslinked polyethylene PEXa

2.1.2.1.1.4 250 psi pressure rated, SDR-9,

2.1.2.1.1.5 Copper tube size, ASTM D-2737, NSF 14, AWWA C-901

2.1.2.1.2 With tracer wire run to the building, terminate in same type and manor as hydrant detail

2.1.2.1.3 There shall be no joints between the corporation valve and curb stop and no joint between the curb stop and meter horn valve.

2.1.2.1.4 Laying length of PVC lines shall afford enough slack to allow for thermal contraction of the plastic and in such manner as to avoid placing it under any undue tension.

2.1.2.1.5 All curb stop boxes shall be wrapped with polyethylene.

2.1.2.1.6 Fittings

2.1.2.1.6.1 Terminal couplings on PVC services shall be made with a pressure tight joint with a Buna-N beveled gasket, and stainless-steel insert sleeve equal to Ford 50-series, and compression fitting which includes a grooved clamp equal to:

2.1.2.1.7 Valves

2.1.2.1.7.1 Corporation (Ball) Valves: Mueller B-25008N; Ford FB1000-Q-NL; A.Y. McDonald 74701BQ.

2.1.2.1.7.2 Curb (Ball) Valves: Mueller B-25155N; Ford B44-Q-NL; A.Y. McDonald 76104T.

2.1.2.1.7.3 Curb Boxes: (Minn. Pattern) Mueller H-10300 and H-10302; Ford E.M. 2-65-56/57 and 2-70-56/57; A.Y. McDonald 5614/15.

2.1.2.1.8 Sizes 3" diameter and larger shall be as follows for Service Lines, Valves, and Fittings:

2.1.2.1.8.1 Connection to Main: Anchoring tee with service line valve anchored to the main branch tee or tapping sleeve and reducing fitting, when appropriate.

2.1.2.1.8.2 Lines: Per "Water Main – Materials" section.

2.1.2.1.8.3 (Curb) Valves: Per "Valves – Materials" section.

2.1.2.1.8.4 Valve Boxes: Per "Valve Boxes – Materials" section.

2.1.2.1.8.5 Fittings: Per "Fittings – Materials" section.

2.1.2.1.9 All stop boxes and service valves shall be exposed, plumb, clean, and operable, when initially installed during new construction, as well as during rehabilitation or repaving projects.

2.1.2.2 DESIGN STANDARDS

2.1.2.2.1 Location, as you face the property, shall be to the left of the sanitary sewer lateral. Each habitable building shall have its own unshared service connection to the main.

2.1.2.2.2 On new construction, curb stop shall not be located within 5 feet of the driveway.

2.1.2.2.3 Water services shall have a trench check dam installed on the property side of the curb stop. See Specification 2.1.3 and Detail Figure 20.

2.1.2.2.4 Pipe design cover:

2.1.2.2.4.1 Turf (Ultimate grade) - 6 feet minimum

2.1.2.2.4.2 Paved areas - 7 feet minimum

2.1.2.2.4.3 Special Situation (i.e.: ditches, etc.) - 5 feet minimum cover with insulation

2.1.2.2.4.4 Under 4 feet of cover water main shall be offset to achieve 6-foot cover.

2.1.2.2.5 Following sizes are minimums, larger sizes may be required based upon fixture units and point of service pressure:

TABLE 1				
Type	Distance (building to main)	No. Of Units		Size
Single Family	<55'			1 ¼" ID
	>55'			1 ½" ID
Two Family	<55'			1 ½" ID

	>55'			2" ID
Multi-Family		<=4		2" ID
		<=8		4" ID
		<=12		4" ID
		<=24		6" ID
		<=48		8" ID
Commercial				2" ID
Industrial				2" ID

2.1.2.2.6 Laterals 2" diameter and smaller may be installed in common trench with the sanitary sewer; Place the shut off at the (future) ROW or easement line.

2.1.2.2.7 Laterals greater than 2" diameter shall be installed a minimum of 8.0 feet away from sanitary or storm laterals; place the shut off at the water main connection tee.

2.1.2.2.8 Generally, PVC service lines shall be installed in accordance with SWS Chapters 5.1.0, 5.2.0 and 5.5.0, and File Nos. 50 & 51, and the following requirements:

2.1.2.2.9 PVC service pipe 1¼" diameter and smaller shall be installed with NO coupling or joint from the corporation stop to the curb stop valves, and the run from the curb stop valve to the meter horn.

2.1.2.2.10 PVC service pipe 1½" and 2" diameter shall be installed with NO coupling or joint from the corporation stop to the curb stop valve, and the run from the curb stop to the meter horn. In the event of a run greater than 55 ft., then the shortest pipe length shall be 20 ft.

2.1.2.2.11 Existing laterals not used in a development shall be abandoned at the main when a development, land division or building razing occurs. See Section 2.2 regarding Abandonment.

2.1.2.2.12 When an existing water service is stubbed to a parcel and is deemed not functional, it will be abandoned, per Section 2.2, and a new service line shall be installed.

2.1.2.2.13 When laterals greater than 2" diameter is existing and the new construction connects to lateral, it will be at the discretion of the Village to allow the connection or abandon at the main and reinstall a new lateral paid for by the property owner. See section 2.2.1.1

2.1.3 Trench Check Dam

2.1.3.1 Materials

2.1.3.1.1 Clay material shall have no organic matter and shall be compacted to 95% standard proctor, or;

2.1.3.1.2 Pre-approved equals such as AquaBlok®, slurry, and others.

2.1.3.2 Design Standards

2.1.3.2.1 A trench check dam shall be installed on all water services.

2.1.3.2.2 For water main pipe, if groundwater is present, a trench check dam shall be installed on all Water Main Pipe or as directed by the Village Engineer.

2.1.3.2.3 The check dam shall be located on the property side of the curb stop.

2.1.3.2.4 Install check dam with bentonite chips 2 feet across the full width of the trench and 4 feet above pipe crown.

2.1.4 Valves

2.1.4.1 Materials

2.1.4.1.1 All valves shall be Resilient type. Acceptable valves are:

2.1.4.1.2 Butterfly Valves - for 16" and larger diameters, conforming to AWWA C504-94, stems sealed by at least two O-Rings, and worm gear operators for 2" square valve key operation from above, turn left (CCW) to open. Install with operating nut on North or East side of water main. Acceptable valves include:

2.1.4.1.2.1 M&H 4500

2.1.4.1.2.2 Kennedy

2.1.4.1.2.3 Pratt Groundhog

2.1.4.1.2.4 Mueller LineSeal III-321-20 or XP-5227-20, or

2.1.4.1.2.5 Pre-approved equal

2.1.4.1.3 RW Gate Valves – For 12" and smaller diameters, conforming to AWWA C-509-94, 250 psi rated, non-rising stems sealed with two O-rings, MJ ends (or MJ-F), turn left (CCW) to open, 2" square operating nut. Acceptable valves include:

2.1.4.1.3.1 Kennedy R/W – 4571

2.1.4.1.3.2 Mueller R/W A-2361 or 2362

2.1.4.1.3.3 Pre-approved equal

2.1.4.1.4 All exposed and non-epoxy coated bolts and nuts on hydrants and valves shall be stainless steel; T-Bolts shall be Cor-Blue or have a fluoropolymer coating as pre-approved by the Village Engineer.

2.1.4.1.5 All valves shall be furnished with interior and exterior epoxy coatings per AWWA C-550-90. All valves not installed in vaults or manholes shall be installed per SWS File No. 37 and shall be wrapped with polyethylene per Section 2.1.10 of these Specifications.

2.1.4.2 Design Standards

2.1.4.2.1 Valve Locations

2.1.4.2.1.1 On all legs of branch lines: Mega-lugged to watermain

2.1.4.2.2 Maximum spacing between valves:

2.1.4.2.2.1 At each intersection

2.1.4.2.2.2 Every 800 feet

2.1.4.2.2.3 Not greater than 24 residential equivalent units (i.e.: 24 SF units; 3 – 8 Family Units)

2.1.5 Valve Boxes

2.1.5.1 Materials

2.1.5.1.1 Valve boxes shall be cast iron, manufactured in the USA, and shall properly accommodate the selected valves. Acceptable manufacturers are:

2.1.5.1.1.1 Tyler Series 6860 US Domestic

2.1.5.1.1.2 Pre-approved equal

2.1.5.1.2 Valve and enclosure type:

Size	Box	Type	Manhole Vault
4"	YES	RW-GV	
6"	YES	RW-GV	
8"	YES	RW-GV	(Special Circumstances)
12"	YES	RW-GV	(Special Circumstances)
16"	YES**	RW-BV	(6 Foot Diameter Option**)

2.1.5.1.3 A valve box #6 base adaptor by Adapter, Inc., or pre-approved equal, shall be furnished as part of the complete valve box for direct-bury gate & butterfly valves.

2.1.5.1.4 Top sections of valve boxes shall be whole factory lengths. Breaking of the top section to shorten its length is not acceptable.

2.1.5.1.5 Screw-in risers are acceptable and preferred. Slip in risers may be used with prior approval.

2.1.5.1.6 Valve box cover shall be a 5-1/4" "MWW" drop in lid with the word "Water" stamped on the top surface.

2.1.5.1.7 All valve boxes shall be wrapped with polyethylene per Section 2.1.10 of these Specifications.

2.1.5.1.8 All valve boxes shall be installed straight and plumb when initially installed during new construction, as well as during rehabilitation or repaving projects. The top of the valve box shall be set flush with pavement grade to avoid damage from snowplows and streets cleaning equipment.

2.1.5.1.9 Valve boxes shall be operable, cleaned and free of debris after installation, after rehabilitation or repaving projects or after any work done by non-Utilities and Streets Department personnel.

2.1.5.1.10 Adjustment to road boxes can be made using slip type, screw insert type and/or slip rings to accommodate a 5 ¼" lid. Smaller than 5 ¼" will not be allowed. The contractor will make Final alignment to the valve box after binder and before the final lift of asphalt.

2.1.6 Valve Vaults

2.1.6.1 Materials

2.1.6.1.1 When designated on the plans or required by the Village Engineer, valve vaults/manholes shall be installed in accordance with this Section.

2.1.6.1.2 All manholes shall be pre-cast concrete with integral base and reinforced concrete flat slab top or approved equal.

2.1.6.1.3 All pre-cast manhole barrel joints shall be made with preformed butyl rubber gasket material (i.e. "Easy Stik" or equal).

2.1.6.1.4 All manhole steps shall comply with SWS Section 8.40.1.A or B.

2.1.6.1.5 All pre-cast manhole barrel sections shall be rotated to align all manhole steps vertically in the manhole.

2.1.6.1.6 All manhole lids shall be equal to Neenah R-1900-D with gasketed lid.

2.1.6.1.7 All frame/casting adjusting rings shall be reinforced concrete rings having 36" I.D. The minimum height for a chimney section shall be the height associated with the proper placement of one 2" adjusting ring. The maximum height of adjusting rings above the cone as measured from the slab top is 16". If more than 16" of adjusting rings are needed to set the casting to finished grade, then an additional barrel section shall be installed on the manhole. Paving rings which have an adjustable diameter is not allowed.

2.1.6.1.8 All chimney joints, including the frame-chimney joint, and all barrel & cone section lifting holes shall be sealed with a premixed, non-metallic, high-strength, non-shrink cementitious grout such as Pennegrout by IPA Systems, or approved equal, which meets requirements of ASTM C-1-91 and C-827 as well as CRD C-588 and C-621.

2.1.6.1.9 Waterproofing mastic shall be placed over all lift holes and exterior of manhole chimneys that are approved to remain raised above existing grade. Trowelable grade mastic, Tremco 60 or approved equal, shall be applied to a minimum 50 mil WFT.

2.1.6.1.10 An external sealing wrap shall be placed at all joints between pre-cast manhole sections. The external sealing wrap shall meet, or exceed, the requirements of

ASTM C-877, Type II. External joint seals shall be MacWrap, as manufactured by Mar-Mac Manufacturing Co. Inc. or pre-approved equal.

2.1.6.1.11 Coal-tar epoxy coating (two coats @ 8.0 mils DFT each) shall be applied to the exterior of ALL manholes in accordance with SWS 8.7.0. Alternate waterproofing materials and application may be pre-approved by the Village Engineer.

2.1.6.1.12 Pipe-Manhole Connection device shall be Kor-N-Seal boot with stainless steel Snap-In banding rings or pre-approved equal.

2.1.6.2 Sample Station

2.1.6.2.1 Eclipses #88SS SMPL STN 7'-0" Extreme Cold

2.1.6.2.2 Installed with its own water curb stop and curb box

2.1.7 Hydrants

2.1.7.1 Materials

2.1.7.1.1 Acceptable manufacturers are:

2.1.7.1.1.1 Kennedy Guardian K-81 UL/FM

2.1.7.1.1.2 Mueller A-403 Super Centurion

2.1.7.1.1.3 Mueller Super Centurion UL/FM

2.1.7.1.1.4 Pre-approved equal

2.1.7.1.2 All hydrants shall be provided as follows:

2.1.7.1.2.1 MJ connection

2.1.7.1.2.2 Turn left to open

2.1.7.1.2.3 Depth of bury 6.5'

2.1.7.1.2.4 Painted Brite Hydrant Red (5 mil DFT)

2.1.7.1.2.5 Break flange (traffic) type

2.1.7.1.2.6 5.25" main valve opening

2.1.7.1.2.7 Two 2.5" hose nozzles

2.1.7.1.2.8 One 4.5" pumper nozzle

2.1.7.1.2.9 One 4' long fiberglass, red reflective tape and white reflective tape with spring hydrant marker. Part #35000W (R&W)-10501

2.1.7.1.3 If during installation and construction the Village deems the coating has been compromised, it will be sandblasted and repainted per section 2.1.7.1.9 at the contractor's expense.

2.1.7.1.4 Hydrant leads shall be six (6) inch, C900.

2.1.7.1.5 Tapping saddle will be an all stainless-steel Smith Blair 663 with a stainless steel Hymax H-304 MJ outlet or Romac SST-MJ stainless steel MJ outlet or equal use core-10 blue bolts. Poly wrap fitting, valves. With Valve box-Tyler only - #6860/MWW lid, Adaptor Inc. #6 base adaptor.

2.1.7.1.6 All fasteners will be stainless steel on all valves and hydrants and on all MJ fittings will be, Cor-Blue T-bolts Birmingham Fastener or equal.

2.1.7.1.7 Contractor shall provide for a 6.5' burial depth for all hydrant leads shown on plans. If a water main burial depth is greater than 6.5', Contractor shall install fitting(s) to raise the hydrant lead to meet the required burial depth.

2.1.7.1.8 Hydrants that are not placed in service shall have a "Not in Service" tag attached to the pumper nozzle and baggy wrapped and tapped.

2.1.7.1.9 Preparation for painting – Sandblast to 100% clean white metal from ground level up to top of hydrant. Dispose of spent materials. Fully enclose hydrant during blasting, priming, and painting. Air dryer shall be used to prevent moisture in the air supply.

2.1.7.1.10 Primer-Devoe 224 high build epoxy primer (or Engineer-approved equal) to a thickness of 4-8 mils (1 mil = 25.4 millimeters).

2.1.7.1.11 Topcoat – Devoe 379UVA urethane epoxy (or Engineer-approved equal) with a minimum thickness of 4 mils. All hydrants shall be fully enclosed during blasting, priming, and painting.

2.1.7.2 Design Standards

2.1.7.2.1 Location

2.1.7.2.1.1 Maximum spacing: 400-ft. diameter from center of hydrant to center of hydrant. If different spacing is required, verify differing condition with Village Engineer and Fire Chief.

2.1.7.2.1.2 At all high points in distribution system.

2.1.7.2.1.3 At intersections, far end of cul-de-sac at lot line extended, and mid-block at lot line extended, where practical. In the event a hydrant location conflicts with a valve location at an intersection, the hydrant tee shall be located 6 feet away from the main valve.

2.1.7.2.1.4 Rural: 3 feet off Right-of-Way. Provide 5-ft. deep x 10-ft. wide hydrant easement.

2.1.7.2.1.5 Urban: 4 feet behind back of curb line.

2.1.7.2.1.6 Side paths, recreation trails and other pedestrian ways: Minimum separation distance from edge of pathway to closest physical feature of the hydrant shall be 18".

2.1.7.2.2 Design Height

2.1.7.2.2.1 Pumper Nozzle shall be above the surrounding final grade by 18 to 24 inches.

2.1.7.2.3 Design Cover

2.1.7.2.3.1 6.5 feet minimum bury depth

2.1.7.2.4 Branch pipe design cover

2.1.7.2.4.1 In Turf: 6.5 feet (Ultimate grade)

2.1.7.2.4.2 In Paved Areas: 7 feet minimum

2.1.7.2.4.3 Special situations (i.e. ditches, etc.): 5 feet minimum cover with insulation

2.1.7.2.4.4 Under 4 feet of cover water main shall be offset to achieve 6 foot cover.

2.1.7.2.5 Break flange shall be at grade or not greater than 6 inches above grade.

2.1.7.2.6 Branch tee shall be Anchor T with gate valve at the tee.

2.1.7.2.7 An asphalt service drive with culvert shall be installed in all ditch crossings greater than 2 feet deep or that have transverse slopes greater than 4H:1V.

2.1.7.2.7.1 The service drive shall be 10 feet wide and extend to 2 feet behind the hydrant. The drive shall be constructed with 10 feet wide by 6 inches deep of No. 2 open graded base course and 10 feet wide by 3 inch depth of asphalt.

2.1.7.2.7.2 Culverts shall be hydraulically sized for each location consistent with Section 4 of the Development Handbook.

2.1.8 Fittings

2.1.8.1 Materials

2.1.8.1.1 All pipe fittings used for water main shall comply with SWS and be manufactured in the USA.

2.1.8.1.2 All fittings shall be Ductile Iron and be Class 350 or greater, conforming to the current ANSI/AWWA C-153/A21.53.

2.1.8.1.3 Fittings shall have a cement mortar lining on the interior in accordance with current (USA Domestic Only) ANSI/AWWA C-104/A21.4.

2.1.8.1.4 Fittings and accessories shall be furnished with mechanical-type joints with lugged retainer glands in accordance with current (USA Domestic Only) ANSI/AWWA C111/A21.11.

2.1.8.1.5 All nuts and bolts shall be stainless steel on hydrants and valves. All T-Bolts shall be Cor-Blue.

2.1.8.1.6 All tees and fittings shall be anchored with restraints or pre-approved equal.

2.1.8.1.7 Angle Fittings shall be as follows:

2.1.8.1.7.1 All 90° bends: Full body, long radius, anchored, and mega-lugged or buttressed.

2.1.8.1.7.2 Other Angle Fittings: Short body acceptable; anchored and buttressed.

2.1.8.1.8 Acceptable manufacturers of Ductile Iron pipe fitting include the following:

2.1.8.1.8.1 American Cast Iron Pipe Co.

2.1.8.1.8.2 Tyler Union

2.1.8.1.8.3 Water Main Couplers

2.1.8.1.8.4 Hymax 4"-16"

2.1.8.1.8.5 Romac 4"-12"

2.1.8.1.8.6 Or approved equal

2.1.8.1.9 Acceptable restraints include the following:

2.1.8.1.9.1 EBAA Mega-Lug

2.1.8.1.9.2 Romac Roma Grip

2.1.8.1.9.3 Stainless steel rodding with stainless steel star bolts

2.1.8.1.9.4 Or approved equal

2.1.8.2 Design Standards

2.1.8.2.1 All fittings shall be wrapped with polyethylene per Section 2.1.10 of the Development Handbook.

2.1.9 Water Metering Requirements

2.1.9.1 Design Standards

2.1.9.1.1 Refer to Village of Germantown Code Chapter 13.37 for general requirements.

2.1.9.1.2 Two-Family units shall require a split service lateral into the building in accordance with Standard Detail Figure No. 19.

2.1.9.1.3 Multi-Family Condominium buildings (4 livable units and over): A water metering room shall be required at the water service entrance location. Each water meter room shall be designed to meet the requirements of the Germantown Water Utility, including an outside doorway. An entry key shall be provided to the Germantown Water Utility. An individual meter required for each unit.

2.1.9.1.4 Multi-Tenant Commercial and Industrial buildings: A water metering room shall be required at the water service entrance location. Each meter room shall be designed to meet the requirements of the Germantown Water Utility, including an outside doorway. All commercial and industrial buildings shall have ball valves installed on the inlet, outlet, and bypass for water meters. An entry key shall be provided to the Germantown Water Utility. An individual meter required for each unit.

2.1.9.1.5 The water meter room shall:

2.1.9.1.5.1 Be large enough to allow work on the water meters. The size of the meter room would vary depending on the meter size(s) and number of meters going into the building. The Utility Department shall approve the size of the meter room.

2.1.9.1.5.2 Be unobstructed by water softeners, vacuum cleaners, garbage cans, electric service, phone services, etc.

2.1.9.1.5.3 Not be used for cleaning supply storage or storage area.

2.1.9.1.5.4 Have adequate heating and lighting

2.1.9.1.5.5 Have a floor drain

2.1.9.1.5.6 The size of the water meter shall be on the plan to make sure the room is big enough to house the entire meter.

2.1.9.1.5.7 Not installed in a ceiling

2.1.9.1.5.8 Minimum 2'-3' off the floor

2.1.9.1.5.9 If meter is installed in a cabinet, minimum 2'x2' removable opening.

2.1.9.1.6 At the meter setting:

2.1.9.1.6.1 1"-2" valves will be all brass USA made only, full port ball valves and brass nipples, 600psi rated Nibco T-585-70 or equal.

2.1.9.1.6.2 A by-pass will be installed on meters 1 ½" and larger.

2.1.9.1.6.3 Bypass pipe to match the diameter of the through pipe.

2.1.9.1.6.4 Bypass pipe to have its own separate shut off valve.

2.1.9.1.7 All gate valves used for branch piping at the meter setting inlet, outlet, and bypass piping 3" and greater will be AWWA resilient wedge epoxy coated C509, NRS (non-rising stem). MJ connection and flanged face at the meter, all stainless-steel bolts and washers-install anti-corrosive agent on threads.

2.1.9.1.8 Irrigation and/or Sprinkler Meter:

2.1.9.1.8.1 A sprinkler or deduct meter is required.

2.1.9.1.8.2 A sprinkler meter is installed parallel to the main meter (New construction).

2.1.9.1.8.3 A deduct meter is installed after the main meter (Existing).

2.1.10 Polyethylene Wrap

2.1.10.1 Materials

2.1.10.1.1 Polyethylene film materials shall comply with SWS Chapter 8.21.0.

2.1.10.1.2 Wrap all ductile iron pipes, valves, fittings, and valve boxes with polyethylene film. When wrapping valve boxes, only wrap the bell portion and the bottom of the first section.

2.1.11 Tracer Wire

2.1.11.1 Materials

2.1.11.1.1 Open Cut tracer wire will be Copperhead #1230-HS-30mil

2.1.11.1.2 Directional Drilling/Boring tracer wire will be Copperhead SoloShot @1245-EHS

2.1.11.1.3 Pipe Bursting tracer wire will be Copperhead SoloShot Extreme – 7x7 stranded, HDPE coated

2.1.11.1.4 Terminate single wire at the back side of each hydrant inside 3" x 4' PVC pipe with a threaded cap. If no hydrant is available, install wire(s) inside a separate Tyler #6860 top section set on bricks road box location field verified. All wires will have a minimum of 2' of slack.

2.1.11.1.5 All mainline tracer wires shall be interconnected in intersections, at mainline tees, and mainline crosses.

2.1.11.2 Design Standards

2.1.11.2.1 Tracer Wire is required on ALL mains and services.

2.1.11.3 Installation

2.1.11.3.1 Open cut-Tracer wire will be Copperhead #1230-HS-30mil.

2.1.11.3.2 Directional drilling/boring-Copperhead SoloShot#1245-EHS

2.1.11.3.3 Pipe bursting-Copperhead SoloShot Extreme-7x7 stranded, HDPE Coated

2.1.11.3.4 Terminate wire at the back side of each hydrant inside 3" x 4' PVC pipe with a FNPT x Spigot PVC DWV clean-out adapter with plug and threaded cap

2.1.11.3.5 If no hydrant is available install wire/s inside a separate Tyler top section set on brick #6860

2.1.11.3.6 Road box location field verified. All wires will have a minimum of 2' slack.

2.1.11.3.7 All mainline tracer wires shall be interconnected in intersections, at mainline tees and mainline crosses

2.1.11.3.8 Tracer wire splicing and connecting to existing tracer wires will use a Copperhead 3-Way Twist lock waterproof connector for 30mil for direct bury-Part #LSC1230B-CTR25. And at the hydrant lead use a "Service lateral lug" connector Part #3WB-01

2.1.11.3.9 At the termination points install ground rod Copperhead #ANO-12. Connect the red wire to the blue tracer wire inside the 3" tube with a double wire lug connector.

2.1.11.3.10 If no hydrant is available install wire inside a separate Tyler full gate valve box top section set on brick #6860 road box location field verified

2.1.11.3.11 Install tracer wire from main to the building using "Copperhead" 1230-HS-Blue wire connect the new tracer wire to existing wire at the main using a Copperhead lockable waterproof connector for direct bury.

2.1.11.3.12 Service Laterals-Terminate tracer wire by building using Copperhead ANO-12 termination rod, connect the red termination wire to the blue tracer wire using a standard wire nut sized for this wire and install the two wires in a 3" X 4' long PCV tube with thread cap. The exposed end needs to be a minimum of 6"-12" visible after finished grade.

2.1.11.3.13 If tracer wire does not exist at the main, install the wire with the service and terminate wire at the main using a Copperhead ANO-12 termination rod. Splice the red wire with the blue wire using a Copperhead lockable waterproof connector for direct bury.

2.1.11.3.14 Proper stripping of HDPE coating will be made using an approved electrical stripping tool, NOT a pocketknife.

2.1.11.3.15 Service Lateral private property-Connect the red wire from the grounding rod and the blue tracer wire using a Copperhead waterproof connector-no ANO-12 termination is needed at the building.

2.1.11.3.16 Install tracer wire in a 3" X 4' long PVC tube with thread cap. The exposed end needs to be a minimum of 6"-12" visible after finished grade.

2.1.11.3.17 Testing-All new tracer wire installation shall be located using a low frequency line tracing equipment, witnessed by the inspector/owner/engineer. This verification shall be performed after rough grading and before finished grade and asphalt.

2.1.12 Tapping

2.1.12.1 Materials

2.1.12.1.1 Service saddles shall be used on all corporation valve sizes larger than 1", subject to specific pipe manufacturer restrictions for the pipe to be tapped. Saddles shall be all 304 stainless, double bolt saddle. Acceptable product for service sizes through 2" corps include, 360 full circumference:

2.1.12.1.1.1 Romac SS1

2.1.12.1.1.2 Smith-Blair 264

2.1.12.1.1.3 Power Seal 3131AS

2.1.12.1.1.4 Hymax Tapped Clamp

2.1.12.1.1.5 Pre-approved equal

2.1.12.1.2 Tapping sleeves that have a flanged outlet shall be used when tapping all existing pipe in service for branch lines 3" and larger in size. The body shall be 304 stainless steel, have a minimum of 1/3 of the interior surface fully lined with a raised "donut" area around the branch opening, and a test port. All bolts, washers, and nuts shall be stainless steel. Acceptable tapping sleeves include:

2.1.12.1.2.1 Hymax Tap

2.1.12.1.2.2 Romac Series SST with 204 stainless steel MJ outlet

2.1.12.1.2.3 Smith-Blair 663 with stainless steel outlet

2.1.12.1.2.4 Ford

2.1.12.1.2.5 Pre-approved equal

2.1.12.2 Design Standards

2.1.12.2.1 Locations of all taps, tapping devices, or fittings/valves for ALL water pipes shall be in accordance with the following:

2.1.12.2.2 The minimum distance from the beginning/end of the Bell or MJ of a water pipe fitting or another tap shall be:

2.1.12.2.2.1 Corporation direct tap = 2 feet

2.1.12.2.2.2 Corporation Tapping Saddle (Up to 2" size) = not less than 2 feet

2.1.12.2.2.3 Branch Tapping Sleeve = not less than 4 feet.

2.1.12.3 Installation

2.1.12.3.1 Activation of tap can only be authorized by the Water Utility after passing pressure tests and safe water tests. A Utility representative shall be present on-site during tapping and sleeve work and any connection(s) to existing main(s). Two working days advance notice before making the connection is required by the Water Utility.

2.1.12.3.2 All taps to water mains shall be made under full system pressure, with the main full of water. No taps may be made on an inactive or non-pressurized main.

2.1.12.3.3 All curb stops shall be installed under full system pressure prior to hydrostatic testing for acceptance of installation.

2.1.12.3.4 When tapping, thoroughly clean and inspect the pipe surface. Wet the pipe surface with a soap/water solution prior to placing a saddle, sleeve or repair clamp. Confirm that the main OD falls within the tapping device's OD range. Ensure that the tapping device is properly aligned to connect with the branch pipe. Ensure that the tapered ends of the gasket are smooth, not folded or rolled in any manner.

2.1.12.3.5 The saddle, sleeve or repair clamp shall be installed and all bolts finger-tightened for uniform gap. Tighten all bolts working from the ends to the center using torque wrenches in accordance with manufacturers specifications. After approximately 10 minutes to allow the gasket to fully compress, all bolts shall be re-tightened to manufacturer's specifications. Make sure the tapping device and tapping machine are fully supported and all cutting edges sharpened. Teflon tape or Teflon pipe dope shall be used on the corporation stop and all other pipe threads.

2.1.12.3.6 If the tapping device is for 3" or larger branch line, the sleeve shall have a test port and be tested at 100 psi for 5 minutes by the Contractor BEFORE the actual tap proceeds. A Water Utility representative shall witness the tapping device installation, pressure test and tapping procedure.

2.1.12.3.7 All taps to existing and new mains shall be "live" or "wet" taps, utilizing a tapping machine with appropriate cutting tools and sharp cutting heads. All tap cut-outs shall be given to the Construction Inspector or Water Utility representative witnessing the tap.

2.1.12.3.8 No taps will be permitted to begin after 1:00 P.M. Additionally, pre-approval by the Water Utility is required for tapping on a Friday or preceding a holiday.

2.1.12.3.9 Two business days prior notice to Water Utility is required to be given prior to installation of new taps on existing mains.

2.1.12.3.10 Notice shall also be given to the Superintendent of Water Utility (Department of Public Works 262-253-7780) for new taps on existing mains.

2.1.13 Bedding, Cover, & Backfill

2.1.13.1 Materials

2.1.13.1.1 Pipe bedding: In accordance with SWS, Section 8.43.2: 3/8" limestone chips for PVC/PVCO pipe. No. 1 clean stone shall be placed within a 5 foot radius of valves and valve boxes.

2.1.13.1.2 Cover Material: In accordance with SWS, Sections 8.42.2 & 8.42.3: 12" above top of pipe. No stone, rock, or other similar material with a sieve size greater than 3/8" shall be permitted. Sand and gravel are prohibited.

2.1.13.1.3 Granular Backfill: In accordance with SWS, Section 8.43.4, Table 39 Graded Aggregates, 1 1/2" graded limestone. In spot construction in trench lengths less than 50' Granular Backfill shall be crushed limestone per SWS, Section 8.43.6.

2.1.13.1.4 Spoil Backfill: In accordance with SWS, Section 8.43.5. No stone, rock or other similar material with a sieve size greater than 3-inches shall be permitted within 2.0 ft. above or beside the pipe. For HDPE service lines, the sieve size shall not be greater than 1¼" within 2.0 ft. above or beside the pipe.

2.1.13.1.5 Slurry Backfill: Aggregate slurry in accordance with SWS, Section 8.43.8, or in accordance with a street opening permit, when issued. In special cases, Village Engineer may require Sand Slurry consisting of 50 pounds of flyash and a ½ bag of Portland cement per cubic yard of mix.

2.1.13.2 Design Standards

2.1.13.2.1 Mechanically compact all trench backfill per Section 2.6.14(b) of SWS. Conform to 95% standard proctor density tested at the Contractor's expense.

2.1.13.2.1.1 Initial lift – 2 feet maximum

2.1.13.2.1.2 Subsequent lifts – 1.5 feet maximum

2.1.13.2.2 Backfill in accordance with all street opening permit(s); generally, this will be slurry aggregate. All areas not within 5 ft. of paved surface (and above a 45-degree intercept line) may receive suitable spoil backfill as provided herein. Prohibited: Debris, frozen material, large clods or stones, organic material, blast rock, stones larger than 6", sand. Contractor shall haul away and dispose of these materials at Contractor's expense.

2.1.14 Caps & Plugs

2.1.14.1 Materials

2.1.14.1.1 Acceptable caps and plugs include:

2.1.14.1.1.1 Clow F-1155, F1159, and F1165 solid cap or Pre-approved equal

2.1.14.1.1.2 Poured buttresses shall be used

2.1.14.1.1.3 Mega-lugs or pre-approved equals shall also be used when appropriate

2.1.15 Casing/Carrier Pipe

2.1.15.1 Materials

2.1.15.1.1 Installation of water lines within casings shall be accomplished by using Stainless Steel Casing Spacers installed in accordance with the manufacturers recommendations. Spacers shall be:

2.1.15.1.1.1 Style CCS by Cascade Waterworks Mfg. Co. of Yorkville, IL

2.1.15.1.1.2 Model 4810 by PowerSeal Pipeline Products of Wichita Falls, TX

2.1.15.1.1.3 Pre-approved equal

2.1.15.1.2 End seals, installed on both ends of each casing, shall be:

2.1.15.1.2.1 Cascade Style CCES

2.1.15.1.2.2 PowerSeal 4810ES

2.1.15.1.2.3 Pre-approved equal

2.1.15.1.3 Water mains within the casing shall be installed with mechanical joints and mega-lugs or pre-approved equal

2.1.15.2 Design Standards

2.1.15.2.1 Casing watermain shall be used for all plastic pipe crossing a right-of-way and for all arterial crossings.

2.2 ABANDONMENT

2.2.1 General

2.2.1.1 All existing water mains and service lines that will not be used in new construction or re-used for reconstruction of existing building sites shall be abandoned at the main, unless approved by the Village Engineer or Water Utility.

2.2.1.2 A representative from the Village Engineering Department or Water Utility shall be present to witness the abandonment.

2.2.1.3 All excavations within public rights-of-way shall require Village and/or County Permits.

2.2.1.4 Excavations within 5 ft. of and under paved surfaces shall be backfilled with Slurry Aggregate per the SWS to within 1.0 ft. of surface, followed by appropriate street restoration and not less than 3-inches of binder and 2-inches of wearing surface bituminous pavements.

2.2.1.5 In special circumstances, when approved in writing by the Village Engineer, water service lines may be temporarily made inactive at the right-of-way or easement boundary. The service shut-off valve shall be turned off and the pipe plugged or capped at the property line. Water services not abandoned at the main shall meet the following conditions:

2.2.1.5.1 As part of the demolition permit, a certified check or Letter of Credit, in the amount of \$5,000 per lateral, shall be submitted to the Village Engineer to guarantee the permanent abandonment of the service at the main is completed in a timely manner.

2.2.1.5.2 Any service line that is not abandoned at the main shall be subject to separate "availability" or "ready to serve" charges in the interim period until properly abandoned.

2.2.1.5.3 Water lines made inactive in this manner shall be marked with a marker post placed 1 ft. from the end of the pipe and extending from the pipe to 3 ft. above the ground surface and painted a blue color.

2.2.1.5.4 The location of the terminal pipe locations shall be surveyed or otherwise “tied” to permanent objects that will remain undisturbed at the site, with an as-built drawing provided to the Village Engineer and Utility Department for record purposes.

2.2.2 Water Services

2.2.2.1 All water services 2” diameter and smaller shall be abandoned at the street main by Turning off the main, remove the corp. and install a Hymax, Smith Blair 261 or equal stainless-steel repair clamp.

2.2.2.2 The remaining service line may be left in place, but the valve box/curb stop shall be removed. Backfill of gate valve box shall consist of stone and/or slurry.

2.2.2.3 The completed work shall be double wrapped with polyethylene per SWS, Chapter 6.21.0.

2.2.2.4 For water service lines larger than 2” diameter, the abandonment procedure would consist of:

2.2.2.4.1 Removal of the service shut-off valve (if at the main), plus 2 - 3 ft. of service pipe at the street main branch fitting. If a blind flange cannot be installed on the T, and the Village deems the fittings are defective the main will be shut down. Cut and remove that section of pipe fittings. Install new pipe with two water main couplers and wrap with baggy.

2.2.2.4.2 Installation of a gasketed blind flange or MJ plug at the branch fitting, as appropriate.

2.2.2.5 All bolts and gaskets shall comply with these standards.

2.2.2.6 In the event that the shut-off valve is not at the street main branch fitting, then 2 - 3 ft of the service pipe shall be removed and a gasketed blind flange or plug installed onto the branch fitting at the main.

2.2.2.7 The valve box/curb stop shall be removed.

2.3 INSPECTION

2.3.1 Submittals & Samples

2.3.1.1 Material samples shall be taken as provided in SWS 8.1.0 and the Contract Documents.

2.3.1.2 All materials delivered to the Work Site shall have legible markings in accordance with ANSI, ASTM, AWWA and SWS 8.3.0.

2.3.1.3 All materials of each type or use shall be from a single manufacturer for the entire Contract.

2.3.1.4 Prior to the start of work, the Contractor shall submit six sets of the following for approval:

2.3.1.4.1 Letter of Certification and representative test reports by manufacturer for all pipe delivered to the Work Site for EACH material item furnished.

2.3.1.4.2 Representative test reports for EACH material item furnished to the Work Site.

2.3.1.4.3 Installation manuals for all mechanical equipment furnished to the Work Site.

2.3.1.4.4 Generally, installation shall be in accordance with SWS and as modified by these Specifications.

2.3.1.4.5 All material specifications to be delivered as a .PDF filetype.

2.3.2 Disinfecting

2.3.2.1 No chlorination or flushing between safe samples.

2.3.2.2 Use only calcium hypochlorite tablets affixed to the top interior wall of the pipe (no powder) to disinfect pipelines and service/fire lines in accordance with SWS, Section 4.3.12. The Contractor Water Utility will collect samples of the chlorinated water for safe water testing. Contractor shall supply all labor assistance to flush mains and to take sample(s). The Water Utility will provide chain of custody bags that will be sealed with the sample onsite.

2.3.2.3 The samples will be taken to a State Certified lab, the water will not be turned back on for new main construction, new development, or new facilities until the Water Utility receives the sample test results.

2.3.2.4 Water wasted to surface may not contain any substances in concentrations that adversely affect the water as determined by the Wisconsin Administrative Code, NR 105 and 106. For chlorine, no total residual chlorine may be measured in the water being discharged to a surface water greater than ambient total chlorine residual in system water supply (typically 0.5 mg/L). Advise the Water Utility and Village Engineer of proposed discharge schedule to arrange DNR-required chlorine residual measurements for main flushing water.

2.3.3 Acceptance Testing

2.3.3.1 General

2.3.3.1.1 Pressure and leakage testing shall include all installed system components, such as mains, branches, services and fire protection taps to terminus of all lines to be installed under the Contract.

2.3.3.1.2 Two (2) business days' notice to the Engineering Department (262-250-4721) and Water Utility shall be required.

2.3.3.1.3 Water for filling, testing and flushing for safe sampling of watermain will be supplied only by permission of the Water Utility via permit. All water that is used for filling new mains, pressure testing, flushing of mains, trench flushing, and safe

sampling etc., will be witnessed by an inspector or Utility employee. Water used will be charged at the current rate.

2.3.3.2 Tests

2.3.3.2.1 Prior to pre-punch list work, tracer wires shall be tested by Contractor prior to Village accepting the work. The Utility Department has the option to spot check the continuity of the tracer wires.

2.3.3.2.2 Pressure and leakage tests shall be performed in accordance with SWS and under the jurisdiction of the Engineering Project Inspector and Water Utility.

2.3.3.2.3 Pressure Test: After the test connections are made and the main filled with water, the test section shall be subjected to water pressure normal to the area. After examination of exposed parts of the system, the test pressure will be increase to 150 psi on the main at the lowest elevation. The main shall be examined and if any defects are found, the Contractor shall immediately make the necessary repairs at his own expense. The pressure test shall be repeated until no defects can be found. The duration of the final pressure test shall be one hour. The pipe shall pass if the final pressure is within 5% of the test pressure for 1 hour. If it is found unnecessary to add water during the duration of the pressure test, the leakage test may be waived at the direction of the Inspector/engineer or Water Utility. If waived by the Inspector and Water Utility, a combination leak/pressure test will be performed.

2.3.3.2.3.1 For HDPE pipe, test duration to be less than 8 hours. If testing is not completed for any reason, de-pressurize and allow to “relax” for 8 hours before resuming test.

2.3.3.2.3.2 PVC Pipe: Conform to Standard Specifications Ch. 4.15.0

2.3.3.2.3.3 Test shall include a Bac-T safe sample.

2.3.3.2.4 Leakage Test: The leakage test, if required, shall be conducted after satisfactory completion of the pressure test. The test section shall be subjected to approximately 100 psi gauge pressure at eh point of highest elevation of the main under test. The duration of the leakage test shall be two hours unless otherwise specified. Should any test section fails to meet the leakage test, the Contractor shall immediately make the necessary repairs at his own expense. The duration of the final leakage test shall be one continuous hour.

2.3.3.2.5 Fire and Combination water/fire service lines shall be tested at 200 psi for 2.0 hours.

2.3.3.2.6 Contractor is responsible for taking samples, witnessed by the Village or onsite inspector and samples put in a sealed chain of custody bag provided by the Village.

2.3.3.2.6.1 No first sample will be taken on a Friday, weekend, or adjacent to a holiday.

2.3.3.2.6.2 Bacteriological Testing: Conform to Standard Specifications Ch. 4.16.0 and NR 811.07. Contractor shall provide analysis results to Village Engineering Dept

in PDF form. If the bacteriological test fails, conform to Standard Specifications Ch. 4.16.3 to re-chlorinate the main.

2.3.3.2.6.3 No Bac-T sample will be accepted if the sample is not taken from a smooth bore sample tap upstream from the discharge flowing pipe. Samples from a hose spigot will not be accepted.

2.3.3.2.7 Tracer Wire Connectivity: All new tracer wire installation shall be located using a low frequency line tracing equipment, witness by the inspector/owner/engineer. This verification shall be performed after rough grading and before finished grade and asphalt.

2.4 OTHER REQUIREMENTS

2.4.1 General

2.4.1.1 Contractor shall be responsible for Digger's Hotline locates, site safety, resident access, traffic control, erosion & sediment control, and protection of existing facilities, features and structures at all times

2.4.1.2 At end of each day and during breaks, Contractor shall install waterproof, leak-proof plugs.

2.4.1.3 At the end of each day, open excavations shall not exceed 25 ft. in length.

2.4.1.4 All lateral trenches shall be backfilled at end of day.

2.4.1.5 At end of each day, contractor shall erect barricades with flashers and snow fencing surrounding excavations.

2.4.1.6 Mainline Installation: Conform to Standard Specifications Ch. 4.3.0 Sawcut Exist Pavements: Wheel-mounting saw required. Sawcut full depth.

2.4.1.7 List of Standard Village Details

2.4.1.7.1 HDPE Hydrant Branch

2.4.1.7.2 Standard Hydrant Bollard

2.4.1.7.3 Relocate Water Main HDPE Pipe

2.4.1.7.4 Relocated Existing Water Main PVC Pipe Only

2.4.1.7.5 HDPE Joint Restraint

2.4.1.7.6 Water Main Reconnection

2.4.1.7.7 Water Main Service Lateral Schematic

2.4.1.7.8 Tracer Wire Construction Layout

2.4.1.7.9 Sample Station Detail

2.4.1.7.10 Meter Sizes/Laying Lengths and Charges

2.4.1.7.11 Bulk Water Purchasing Process and Charges

3 SANITARY SEWER SYSTEM

All labor and material shall be governed by requirements of the Milwaukee Metropolitan Sewerage District (MMSD) and the latest edition and all amendments thereto of the Standard Specifications for Sewer and Water Construction in Wisconsin (SWS), Public Service Commission (PSC) Rules and Wisconsin Department of Natural Resources (WDNR) Regulations, WisDOT Standard Specifications for Highway and Structural Construction, Chapter DSPS 382, and Village of Germantown Municipal Code unless otherwise specified in these Specifications, whichever is more restrictive.

3.1 SPECIFICATIONS

3.1.1 Sanitary Sewer Main and Laterals

3.1.1.1 Materials

3.1.1.1.1 All pipe used for sanitary and private main interceptor sewers shall be:

3.1.1.1.1.1 PVC (solid wall) SWS Section 8.10.0, ASTM D3034, SDR-26, SDR-30

3.1.1.1.1.2 PVC (solid wall, green in color for in-ground identification) SWS Section 8.20.0, AWWA C-900 or C-905

3.1.1.1.1.3 Or Engineer approved equal

3.1.1.2 Design Standards

3.1.1.2.1 Design flow coefficients as determined by the Village Engineer, subject to the following:

3.1.1.2.1.1 Residential/Multi-Family (Per MMSD Flow Allocation Worksheet)

Base Sanitary Flow	102 gpcd
Max Daily	1,269 gpcd
Residential densities are to be determined per MMSD Annual Cost Recovery Manual	

3.1.1.2.1.2 Industrial & Institutional Areas (Per MMSD Flow Allocation Worksheet):

Base Sanitary Flow	1,500 gpd/Acre
Max Daily	3,250 gpd/Acre

3.1.1.2.1.3 Large Commercial (Per MMSD Flow Allocation Worksheet):

Base Sanitary Flow	2,250 gpd/Acre
Max Daily	4,000 gpcd/Acre

3.1.1.2.2 Design flows and peaking factors are to be referenced to MMSD Rules and Regulations and as determined by the Village Engineer. Design objectives shall result in elimination, to the greatest extent possible, of all infiltration and inflow.

3.1.1.2.3 Minimum Main and Lateral Sizes:

Residential	8" main / 6" Lateral
Industrial/Commercial/Multi-Family & PUD	8" main / 6" Lateral
Shall accommodate future tributary areas as directed by the Village Engineer	

3.1.1.2.4 Minimum Slopes:

Pipe Size	Minimum Slopes
8"	0.40% (Dead end reach 0.60%)
10"	0.28% (Dead end reach 0.40%)
12"	0.22%
15"	0.15%
18"	0.12%
21"	0.10%
24"	0.08%
Other Sizes	Per Engineering Services Division

3.1.1.2.5 Complete sewer design calculations and sewer system plans are required with construction plan submittals.

3.1.1.2.6 Conceptual sewer system plans are required for proposed developments located within the Ultimate MMSD Service Area even if sanitary sewer currently is not available. A determination is needed at the conceptual stage that future gravity sewer systems will work when needed.

3.1.1.2.7 Center of manhole shall coincide with street centerline, and center of main shall be within 5 feet of centerline on curvilinear street segments.

3.1.1.2.8 Invert shall not be less than:

Distance below the centerline grade of the street	Road ROW Width
11.0 Feet	60/66 FT
12.0 Feet	80 FT
13.0 Feet	>80 FT and Cul-De Sacs

3.1.1.2.9 Minimum sewer depth shall be 8 feet from finished grade to top of pipe under exceptional circumstances and approval of Village Engineer. Sewer depths shall provide gravity flow for basement floor drains and plumbing fixtures. "Hung" services are prohibited. Grinder pumps may be considered by Village Engineer.

3.1.1.2.10 Pipe with cover depth of greater than 20 feet shall have the pipe material approved by the Village Engineer and shall be designed conforming to Standard Specification Ch. 5.3.12 and Table 12.

3.1.1.2.11 All sewer pipes shall be laid in accordance with SWS, Chapter 3.2.0

3.1.1.2.12 All connections to manholes shall be in accordance with SWS, Section 3.5.7.
Connections to manholes with preformed troughs in the bench shall be made in accordance with the procedure described in Section 3.1.7.3.5.

3.1.1.2.13 All sewer pipes shall terminate with top of pipe flush to the inside wall of the manhole. All annular spaces shall be filled with a cementitious filler to prevent the breakage of the pipe while cleaning.

3.1.2 Sanitary Force Main

3.1.2.1 MATERIALS

3.1.2.1.1 All pipe used for sanitary force (pressure) mains shall be:

3.1.2.1.2 PVC (solid wall) SWS 8.51.2, AWWA C-900 or C-905

3.1.2.1.3 PVCO AWWA C-909, Class 150

3.1.2.1.4 High density black Polyethylene Force Main Pipe SWS 8.51.3, ASTM F-714; or Green Stripe

3.1.2.1.5 Fusible PVC C-900

3.1.2.1.6 Linked PVC C-900

3.1.2.2 All pipe shall conform to Ductile Iron Pipe OD.

3.1.2.3 Valves shall be:

3.1.2.3.1 Dezurik Series 100 Eccentric Valves cast iron epoxy-coated body, hard rubber-lined, MJ,

3.1.2.3.2 Low friction Buna-vee packing, neoprene plug facing, ABG6H6 actuator, with stainless steel bolts, and plug valve adaptor bracket with valve box

3.1.2.3.3 Alternatives shall be pre-approved by the Village Engineer.

3.1.2.4 DESIGN STANDARDS

3.1.2.4.1 Minimum design depth shall have 8 feet of cover.

3.1.2.4.2 Buried tracer location wire is required above the force main.

3.1.2.4.3 Maximum spacing of location boxes: 300 feet or as directed by the Village Engineer.

3.1.2.4.4 Velocity/Size:

3.1.2.4.4.1 Hazen-Williams formula "C" value of 120.

3.1.2.4.4.2 Velocity 2.0 – 6.0 fps for lowest energy pumping cost, as approved by the Village Engineer.

3.1.2.4.5 High/Low Points:

3.1.2.4.5.1 Air relief valve sizing calculations shall be submitted with Plans. A.R.I to be used.

3.1.2.4.5.2 Clean-outs shall be installed at designated points.

3.1.2.4.5.3 6-ft. diameter manhole enclosures shall be installed.

3.1.2.4.6 HDPE Connections & Fittings: Joined by heated butt fusion for HDPE. Conform to ASTM D2657 and manufacturer specifications. Internal/external beads shall not be removed.

3.1.2.4.7 HDPE Main & branch joints: Joined by electrofusion conforming to manufacturer specifications. Internal/external beads shall not be removed.

3.1.2.4.8 PVC water class pipe. 4" thru 12" dia. = Class 150-DR18 conforming to AWWA C-900, conforming to standard specifications Ch. 4.6.0 and 8.20.01.

3.1.2.4.8.1 Fittings = ductile iron conforming to Standard Specification 8.22.0.

3.1.2.4.8.2 4" thru 12" dia. = Class 250 mechanical joints

3.1.2.4.8.3 Nuts & Bolts = Cor-Blue

3.1.2.4.8.4 Mechanical joint retainer glands = Mega-Lug; Buttresses also required.

3.1.2.4.8.5 Tees, crosses, bends, offsets, and other fittings shall conform to Standard Specification CH. 8.22.0. Acceptable supplier shall be Tyler or equal.

3.1.2.4.8.6 Triple wrap all ductile iron fittings with polyethylene. Conform to Standard Specifications Ch. 4.4.4 and 8.21.0

3.1.2.5 Warning Tape

3.1.2.5.1 Terra Tape Standard 250 manufactured by Reef Industries, Inc., Shieldtec manufactured by Empire Level Manufacturing Corp., Milwaukee, WI, (or Engineer approved equal). Tape shall read "Caution – Sanitary Line Buried Below". Tape shall be green and 3" wide. Install over the cover material.

3.1.3 Tracer Wire

3.1.3.1 Materials

3.1.3.1.1 Tracer wire for sanitary laterals shall be "Copperhead" 1230-HS-Green wire.

3.1.3.1.2 Tracer wire for force main shall be "Copperhead" 1230-HJS-Green wire.

3.1.3.1.3 Tracer wire for directional drilling/boring shall be "Copperhead" #1245-EHS.

3.1.3.1.4 Tracer wire for pipe bursting shall be "Copperhead" Soloshot Extreme – 7x7 Stranded, HDPE coated.

3.1.3.1.5 Connectors for open cut laterals shall be a Snakebite Twistlock or direct bury lug connector.

3.1.3.1.6 Termination of lateral tracer wire at main shall be a ground rod "Copperhead" @ANO-12. Connect the red wire to green wire using Twist Lock or buried lug connector.

3.1.3.2 Design Standards

3.1.3.2.1 Tracer wire shall be required on all force mains.

3.1.3.2.2 Tracer wire shall be required on all laterals.

3.1.3.2.3 Tracer wire shall be required on all directionally drilled pipe.

3.1.3.3 Installation

3.1.3.3.1 Contractor shall verify during backfilling of cover material that the tracer wire has remained on top of the lateral.

3.1.3.3.2 Connections with the tracer wire shall require approval by Wastewater Superintendent.

3.1.3.3.3 Lateral tracer wire shall be terminated at start-end points. At the main use a ground rod and at ROW run to surface with a minimum of 2 feet of wire wrapped around marking post.

3.1.3.3.4 A 1½" diameter PVC sch. 40 pipe with screw cap to be used at termination point when extended to dwelling. A 1.5-ft. pigtail of excess tracer wire shall stick out of the top of the pipe.

3.1.3.4 Testing

3.1.3.4.1 All tracer wire shall be tested prior to acceptance by Village Engineer. Testing by using a radio frequency locator.

3.1.4 Bedding, Cover, and Backfill

3.1.4.1 MATERIALS

3.1.4.1.1 Pipe Bedding/Cover: In accordance with SWS, as follows –

3.1.4.1.1.1 Flexible wall pipe shall be Class "B" up to 12" above top of pipe; 3/8"-5/8" limestone chips.

3.1.4.1.1.2 Rigid wall pipe with diameters equal to or less than 21" shall have 3/8"-5/8" limestone chips up to 12" above top of pipe.

3.1.4.1.1.3 Rigid wall pipe with diameters greater than 21" shall have ¾" limestone chips up to 12" above top of pipe.

3.1.4.1.1.4 Ductile Iron pipe shall be Class B to 12" above top of pipe, torpedo sand.

3.1.4.1.1.5 Fittings/Valves shall be Class B to 12" above top of pipe, torpedo sand.

3.1.4.1.2 Cover Material: In accordance with SWS, Section 8.43.3. No stone, rock or other similar material with a sieve size greater than 1" shall be permitted.

3.1.4.1.3 Granular Backfill: In accordance with SWS, Section 8.43.4. No stone, rock or other similar material with a sieve size greater than 3" shall be permitted. Granular backfill shall be crushed recycled concrete or crushed limestone per SWS, Section 8.43.6.

3.1.4.1.4 Spoil Backfill: In accordance with SWS, Section 8.43.5. No stone, rock or other similar material with a sieve size greater than 3" shall be permitted within 2.0 ft. above the pipe. Not allowed under pavement or stone walkways.

3.1.4.1.5 Slurry Backfill: Aggregate slurry in accordance with SWS, Section 8.43.8 and requirements of Village Engineer, or in accordance with street opening permit, when issued. In special cases, Village Engineer may direct the use of Sand Slurry consisting of 50 pounds of fly ash and a ½ bag of Portland cement per cubic yard of mix.

3.1.4.1.6 Prohibited: Debris, frozen materials, large clods or stones, organic material, black rock (uncrushed), stones/rocks larger than 3", and sand. Contractor shall haul away and dispose of these materials at contractors expense.

3.1.4.2 DESIGN STANDARDS

3.1.4.2.1 Backfill in accordance with all street opening permit(s), generally will be slurry aggregate. All areas greater than 5 ft. from a paved surface (and above a 45-degree intercept line) may receive suitable spoil backfill as provided herein.

3.1.4.3 INSTALLATION

3.1.4.3.1 Care shall be taken by the Contractor when backfilling to prevent any movement of the pipe from proper alignment and grade. Contractor is responsible for determining that the finished sewer remains at the required elevation and grade.

3.1.4.3.2 Mechanically compact all trench backfill to a minimum 95% standard Proctor density per SWS, Section 2.6.14(b). The initial lift to be compacted shall have a 2 ft. loose thickness. Each subsequent lift to be compacted shall have a maximum 18" loose thickness. Contractor shall place smaller lifts if the required compaction cannot be achieved.

3.1.5 Sanitary Manholes

3.1.5.1 MATERIALS

3.1.5.1.1 All sanitary manholes shall be pre-cast concrete conforming to Standard Specifications Ch. 8.39.0 and File No. 12

3.1.5.1.2 All sanitary manholes shall have a wall thickness of 5" minimum.

3.1.5.1.3 The manholes shall be sized as follows:

Downstream Pipe Size	Minimum Manhole I.D.
8-24"	48"
30-42"	60"
>42"	72"
Sampling Manholes	48" (No flat decks allowed)

3.1.5.1.4 All sanitary and sampling manhole cone sections shall be eccentric. Concentric cones are prohibited.

3.1.5.1.5 All manholes shall have spray epoxy coating:

3.1.5.1.6 MH Exterior: 2 coats (black) of Ameron International, Amercoat 78 HB at 8-10 mils. each.

3.1.5.1.7 MH Interior: 2 coats (white) of Permite PCS-9043 Type II Permox pipe glaze at 20 mils. each.

3.1.5.1.8 Coatings shall be applied by suppliers at the plant.

3.1.5.1.9 All joint seals shall consist of one of the following:

3.1.5.1.9.1 Kentseal butyl rubber sealant

3.1.5.1.9.2 Or Engineer approved equal

3.1.5.1.10 External joint seals shall consist of following:

3.1.5.1.10.1 MacWrap External Joint Sealers by MarMac Manufacturing

3.1.5.1.10.2 Or Engineer approved equal

3.1.5.1.11 External for MH w/ Precast Outside Drop: EZ-Wrap by Press Seal Gasket Corp. primed with EZ-Stick No. 4 Primer

3.1.5.1.11.1 Extruded butyl adhesive tape bonded to the concrete.

3.1.5.1.12 Chimneys shall use HDPE or EPP 5000 Series rings meeting ASTM D4976 or ASTM D3575. Precast concrete rings are not allowed.

3.1.5.1.13 Chimneys shall have a minimum height of 2" and a maximum height of 16".

3.1.5.1.14 HDPE Rings in pavements:

3.1.5.1.14.1 Drill two ½" diameter holes 180o apart on mandatory 2" thick EPP ring (Cretex part number 40-27GF-200). Drill into corbelled section of the manhole, ring shall be drilled prior to placing on manhole.

3.1.5.1.14.2 Apply 2 beads of M-1 adhesive 1/2"x1/2" in a continuous circle on corbal. Install drilled EPP ring and anchor

3.1.5.1.14.3 with a 4" Rawl Power Bolt utilizing a 2" diameter fender washer. Tighten until bolt head is flush with the top of the 2" ring.

- 3.1.5.1.14.4 Install ¼" Ladtech topper ring set in M-1 Adhesive as described above.
- 3.1.5.1.14.5 Dry stack chimney to proper height, including solid HDPE topper ring. Pay special attention to slope and use appropriate slope rings.
- 3.1.5.1.14.6 Once desired height and slope are achieved, mark rings to align desired stacking order and placement.
- 3.1.5.1.14.7 Apply bead of caulk around lip of adjusting ring and re-stack rings. Apply 2 beads of caulk on topper ring, one towards the outside and one towards the inside. Topper ring does not have a locking lip so be cautious ring does not slip during seal installation.
- 3.1.5.1.14.8 Install seal per manufactures specifications.
- 3.1.5.1.15 Adhesives: M-1 (Chem-Link Corp.) used on EPP rings. Gun grade butyl rubber adhesive sealant on HDPE rings.
- 3.1.5.1.16 Seals to have order-to-fit Adapter internal/external with rubber sleeve sealing exterior from frame to corbel.
- 3.1.5.1.17 PE wrap to be installed using double 6 -mil polyethylene wrap from top of frame to 84" min. depth.
- 3.1.5.1.18 EPP Rings in turf to adhere to following:
- 3.1.5.1.18.1 Drill two ½" diameter holes 180° apart on mandatory 2" thick EPP ring (Cretex part number 40-27G-200). Drill into corbelled section of the manhole, ring shall be drilled prior to placing on manhole.
- 3.1.5.1.18.2 Apply 2 beads of M-1 adhesive 1/2"x1/2" on corbal. Install drilled EPP ring and anchor with a 4" Rawl Power Bolt utilizing a 2" diameter fender washer. Tighten until bolt head is flush with the top of the 2" ring.
- 3.1.5.1.18.3 Dry stack chimney to proper height, including solid Grade Finish ring. Pay special attention to slope and use appropriate slope rings.
- 3.1.5.1.18.4 Once desired height and slope are achieved, mark rings to align desired stacking order and placement.
- 3.1.5.1.18.5 Apply 2 beads of M-1 in keyway area of adjusting rings and re-stack rings.
- 3.1.5.1.18.6 Adjusting rings will be lag bolted in 4" height increments with a ½" x 5" steel wood lag bolt and 2" fender washer with bolts alternating 180° apart with each 4" rise in height
- 3.1.5.1.18.7 Install seal per manufacturer's specifications.
- 3.1.5.1.19 For frames in pavement, use Neenah R-1661 frame with solid gasketed lid and 2 concealed pick holes. Conform to Standard Specifications Ch. 3.5.0 For frames in turf, use: Neenah R-1661 bolt-down frame w/ solid gasketed lid and 2 concealed

pick holes. Conform to Standard Specifications Ch. 3.5.0. Bolts coated with anti-seize compound. Frames to be anchored to chimney with 1/2" dia. steel wood lag bolts extending 6" into chimney or to a depth that is practical for the chimney height and sealed with Permatex Ultra Series black, blue or grey silicone adhesive.

3.1.5.1.20 Pavement Ring required to be Neenah R-1979 Series Ref. #1661-7158.

3.1.5.1.21 Pavement ring elevations as follows:

3.1.5.1.21.1 Top of frame equal to binder grade less ¼"

3.1.5.1.21.2 2" Paving rings used for surface lift adjustment.

3.1.5.1.22 Grout, if approved by Village Engineer and Utility Superintendent, can be acrylamide or polyurethane grout for manhole repair/rehabilitation.

3.1.5.2 DESIGN STANDARDS

3.1.5.2.1 Maximum manhole spacing for 15" diameter or less DIPS mainline = 400'.

3.1.5.2.2 Maximum manhole spacing for > 15" diameter DIPS mainline shall conform to NR 110.13(3)(b).

3.1.5.2.3 Manholes shall connect 2 pipes having differing diameter.

3.1.5.2.4 Minimum elevation difference between influent and effluent pipes in manholes = 0.1'.

3.1.5.2.5 Maximum elevation difference between influent and effluent pipes without outside drop in manholes = 2.0'.

3.1.5.2.6 Lift holes: Exterior lift holes only (interior lift holes are prohibited).

3.1.5.2.7 Full benches are prohibited. Conform to Standard Specifications Ch. 3.5.4© and File No. 13. w/e full benches and with long radii.

3.1.5.2.8 Outside drops to conform to Standard Specifications Ch. 3.5.8 and Fil No. 19/20

3.1.5.2.9 One full-length of pipe shall precede the tee connecting the manhole and the drop segment.

3.1.5.2.10 Elevation for top of frame shall be equal to binder grade less ¼". 2" Paving ring required for surface lift adjustment.

3.1.5.2.11 Connections shall be cored. Cutting or breaking is prohibited.

3.1.5.2.12 Bulkheads for future connections are prohibited.

3.1.5.2.13 Manhole steps shall conform to Standard Specifications Ch. 2.5.4(g) and 8.40.0, and File #15 and #12. Steps in chimney are prohibited.

3.1.5.2.14 Sampling manholes are required at all commercial laterals and shall conform to Village of Germantown standard detail.

3.1.5.2.15 Sampling manholes to be minimum 48" diameter. No flat deck allowed.

3.1.5.2.16 Minimum elevation difference between influent and effluent pipes in manholes = 0.1'.

3.1.5.2.17 Manhole installations to be inspected by Village Engineer or Wastewater Utility.

3.1.6 Sanitary Sewer Laterals

3.1.6.1 MATERIALS

3.1.6.1.1 All pipe used for sanitary laterals shall be:

3.1.6.1.2 PVC (solid wall) SWS 8.10.0, ASTM D-3034, SDR-35 or 26

3.1.6.1.3 PVC (solid wall) SWS, Section 8.20.0, AWWA C-900 or C-905

3.1.6.1.4 Risers shall be as required by the plans in accordance with these standards or as pre-approved by the Village Engineer.

3.1.6.1.5 Risers (shall be tees): Minimum depth below road centerline shall be per Section or 5 feet below basement, whichever is greater. Sewer depth to be greater than 14 feet for riser. (Per SWS File Nos: 10A, 10B, 10C, 10D, & 10E).

3.1.6.1.6 Tracer wire required on laterals. See section 3.1.3 for specifications.

3.1.6.2 DESIGN STANDARDS

3.1.6.2.1 Sites are allowed one (1) sanitary lateral connection. In special circumstances, additional laterals may be allowed with the written permission of the Village Engineer and the Wastewater Superintendent and with approval of the State.

3.1.6.2.2 Minimum size shall be 6" diameter.

3.1.6.2.3 Slope at ¼" per foot. Under exceptional conditions, the Village Engineer may permit minimum slope = 1/8" per foot in ROW/easement.

3.1.6.2.4 All connections to existing mains and manholes shall be in accordance with Section 3.1.5.

3.1.6.2.5 Lateral connections to manholes shall not be made unless pre-approved by the Wastewater Superintendent. Connections to manholes in new construction shall not be above the outlet sewer crown and have a smooth paved channel constructed to convey lateral waste to main outlet channel.

3.1.6.2.6 Laterals may not connect to manholes except in cul-de-sacs (permanent end of line). In cul-de-sacs, special manhole detail and construction of benches and lateral pipe connections are required.

3.1.6.2.7 If it is deemed necessary to install a lateral to an existing manhole, and the manhole has to be cored and booted to accept this lateral, this manhole shall be vacuum tested according to the SWS.

3.1.6.2.8 Existing laterals not used in a development shall be abandoned at the main when a development, land division or building razing occurs. See Section 3.2.

3.1.6.2.9 Each habitable building shall have a separate lateral connection to the sewer main.

3.1.6.2.10 Sanitary laterals shall have a trench check dam installed at the property line. See Specification 3.1.4.

3.1.7 Lateral Connections

3.1.7.1 Connection of New Sanitary Laterals to Existing Mains shall be as follows based on existing main material:

3.1.7.1.1 ABS - Truss Pipe

3.1.7.1.1.1 Location - not closer than 36" to an existing joint or fitting.

3.1.7.1.1.2 Hole - Core drill or saw-cut with appropriate cutting tools. Deliver "cut-out" to Construction Inspector or Utility Department representative.

3.1.7.1.1.3 Insert Tee only allowed connection. With exception on 8" only, a wye shall be used.

3.1.7.1.2 Concrete Pipe

3.1.7.1.2.1 Location - not closer than 24" to an existing joint or fitting.

3.1.7.1.2.2 Hole - Core with appropriate cutting tools. Deliver "cut-out" to Construction Inspector or Utility Department representative.

3.1.7.1.2.3 Insert Tee only allowed connection. With exception on 8" only, a wye shall be used.

3.1.7.1.3 PVC Pipe

3.1.7.1.3.1 Location - Not closer than 36" to an existing joint or fitting.

3.1.7.1.3.2 Hole - Core drill or saw-cut with appropriate cutting tools. Deliver "cut-out" to Construction Inspector or Utility Department representative.

3.1.7.1.3.3 Inserta Tee on 10" and greater pipe and manufactured wye on 8" pipe and below shall be used, with repair coupling. Fernco coupling will not be allowed.

3.1.7.1.4 Vitrified Clay Pipe

3.1.7.1.4.1 Location - not closer than 24" to an existing joint or fitting.

3.1.7.1.4.2 8" wye shall be installed for connection device with PVC pipe up and down with Fernco Strong Back connection device.

3.1.7.2 Due to increasing incidents with plugs being left in sewer lines, the Village of Germantown Utility Department is requiring Contractors use a mechanical plug only.

This shall be performed and documented by the Germantown Utility personnel. The Germantown Utility shall be notified when a plug is to be removed.

3.1.7.3 Prior to applying curing material on the concrete, the face of the curb shall be “branded” with a “S” designating the location(s) of sanitary laterals. Physical placement of the branding shall be reasonably accurate in a vertical plane above the respective lateral.

3.1.7.4 Connection of New Sanitary Laterals to Existing Sanitary Manholes will only be allowed on a case-by-case basis and when pre-approved by the Director of Public Works or their designee, and shall be subject to following requirements:

3.1.7.4.1 Location: Invert of new lateral may be permitted a maximum of 12” above spring line of outlet sewer, or use outside drop inlet per SWS for main sewers;

3.1.7.4.2 Connection Device: Kor-N-Seal boot or pre-approved equal with stainless steel snap-in ring.

3.1.7.4.3 Any lateral that is connected into a manhole shall have a smooth concrete bench/channel placed to convey lateral waste flow into mainline channel.

3.1.7.4.4 Prior to applying curing material on the concrete, the face of the curb shall be “branded” with a “S” designating the location(s) of sanitary laterals. Physical placement of the branding shall be reasonably accurate in a vertical plane above the respective lateral.

3.1.8 Casing Pipe

3.1.8.1 MATERIALS

3.1.8.1.1 Installation of sewer lines and force mains within casings shall be accomplished by using Stainless Steel Casing Spacers installed in accordance with the manufacturer’s recommendations. Spacers shall be:

3.1.8.1.1.1 Cascade Style CCS; or

3.1.8.1.1.2 PowerSeal 481; or

3.1.8.1.1.3 Pre-approved equal.

3.1.8.1.2 End seals shall be installed on either end of each casing and shall be one of the following:

3.1.8.1.2.1 Cascade Style CCES; or

3.1.8.1.2.2 PowerSeal 4810 ES; or

3.1.8.1.2.3 Pre-approved equal.

3.1.8.1.3 Force main piping within the casing shall be installed with mechanical joints and mega-lugs.

3.1.9 Trench Check Dam

3.1.9.1 MATERIALS

3.1.9.1.1 Clay material shall have no organic material and shall be compacted to 95 percent standard proctor. Or;

3.1.9.1.2 Pre-approved equals such as: AquaBlok®, slurry and others.

3.1.9.2 DESIGN STANDARDS

3.1.9.2.1 Trench check dam shall be installed on all sanitary laterals.

3.1.9.2.2 The check dam shall be located at the property line.

3.1.10 Polyethylene Wrap and Corrosion Protection

3.1.10.1 MATERIALS

3.1.10.1.1 Polyethylene film materials shall comply with SWS, Section 8.21.0.

3.1.10.2 DESIGN STANDARDS

3.1.10.2.1 All metallic pipe, fittings and valves shall be wrapped and protected per SWS, Section 4.4.4 and 4.4.5.

3.1.11 Grease Interceptors

3.1.11.1 All buildings with food service preparation on-site (now or at any future time) shall be required to install, maintain, and operate an exterior or interior grease interceptor tank sized in accordance with the Department of Safety and Professional Services (DSPS). State plumbing reviews by the DSPS shall be completed before a plumbing permit will be issued. Construction of the Grease Interceptor shall, in addition to requirements of the Plumbing Code, conform to the following standards. These standards are intended to minimize the potential for groundwater infiltration and inflow or rainwater from entering the sanitary sewer system via this system component.

3.1.11.2 MATERIALS

3.1.11.2.1 Interior grease interceptors shall be constructed in a watertight manner of one of the following materials:

3.1.11.2.1.1 Precast reinforced concrete

3.1.11.2.1.2 Reinforced monolithic concrete

3.1.11.2.1.3 Coated 12-gauge steel

3.1.11.2.1.4 Fiberglass

3.1.11.2.1.5 Plastic

3.1.11.2.1.6 Other approved materials

3.1.11.2.2 Exterior grease interceptors shall be pre-cast concrete with integral base when required by the Village Engineer and shown on the Plans.

3.1.11.2.3 Exterior grease interceptors shall be equipped with water-tight locking frame and lids.

3.1.11.2.4 The exterior walls of the tank shall be coated with coal-tar epoxy per SWS, Chapter 8.49.2, (2 coats at 8 mil DFT minimum each, totaling 16 mil DFT minimum). The coating material shall be equal to:

3.1.11.2.4.1 Tnemec Series 253 H.S. Tnemec Tar; or

3.1.11.2.4.2 ICI Devoe DEVTAR 5A; or

3.1.11.2.4.3 Pre-approved equal.

3.1.11.2.5 Coating(s) shall be applied in accordance with the coating manufacturer's recommendations and preferably at the place of tank manufacture. Each manhole section shall be inspected and marked for proof of inspection prior to delivery to the project site. Alternate waterproofing materials and application may be used if pre-approved by the Village Engineer. Manhole sections that are not properly coated with coal-tar epoxy will be rejected and shall be removed from the project site.

3.1.11.2.6 All barrel joints shall have a mastic or gasket type joint seal. The exterior shall be wrapped with an additional joint seal that meets requirements of ASTM C-877, Type II, such as "Mac-Wrap" or pre-approved alternate.

3.1.11.2.7 All manhole or tank access or inspection chimneys will be HDPE or EPP adapter seal frame – R1661 – Bolt down.

3.1.11.3 DESIGN STANDARDS

3.1.11.3.1 The approach section of pipe approaching the tank shall be straight for a distance of at least 20 pipe diameters with no connections, drops, or bends.

3.1.11.3.2 There should be no grade changes, angle points, or connections at the structure.

3.1.11.3.3 In Flood Plain Areas: Tank access or inspection chimneys shall be 2.0 feet above 100-yr Flood elevations as determined via FEMA Mapping.

3.1.11.3.4 When practicable, grade earth at 5H:1V slope around manhole openings. In paved areas, slope drainage away from the manhole openings.

3.1.11.3.5 Because inlet and outlet pipe slopes are critical, the location of the exterior grease trap tank shall require prior approval of the Village Engineer for location and grades. For projects requiring prior Site Plan Approval requirements, this site element shall be included on the Site Plan Submittal(s).

3.1.12 Lift Stations

3.1.12.1 Consult with the Village Engineer and Wastewater Utility for design requirements.

3.1.13 Insulation

3.1.13.1 MATERIALS

3.1.13.1.1 Minimum of 2" thick Styrofoam plastic foam boards as manufactured by:

3.1.13.1.1.1 Upjohn; or

3.1.13.1.1.2 Dow Chemical Company, or

3.1.13.1.1.3 Pre-approved equal.

3.1.13.2 DESIGN STANDARDS

3.1.13.2.1 All sanitary sewer pipes (mains, force mains & laterals), having less than 5.0 ft. of cover material, shall be insulated.

3.2 ABANDONMENT

3.2.1 GENERAL

3.2.1.1 All existing sanitary sewer mains and service lines, that will not be used in new or re-used in reconstruction of existing building sites, shall be abandoned at the main.

3.2.1.2 Abandonment shall be witnessed by the Village Inspector or a Utility Representative.

3.2.1.3 Main and/or service abandonment at the street main shall be a condition of any site demolition permit(s) issued or in the case of duplication, service lines that will remain unused on new construction.

3.2.1.4 All excavations within public rights-of-way shall require Village and/or County Permits.

3.2.1.5 Excavations within 5 ft. of and under paved surfaces shall be backfilled with Slurry Aggregate per the SWS to within 1.5 ft. of surface, followed by appropriate street restoration and not less than 3-inch of binder and 2-inch of wearing surface bituminous pavements.

3.2.1.6 In special circumstances, when approved in writing by the Village Engineer and the Utility Superintendent, sanitary sewer service lines may be temporarily made inactive at the right-of-way or easement boundary. Sanitary sewer lines shall be plugged or capped to be made watertight at the property line. Sewer service lines not abandoned at the main shall meet the following conditions:

3.2.1.6.1 As part of the demolition permit, a certified check or Letter of Credit, in the amount of \$5,000 per lateral, shall be submitted to the Village Engineer to guarantee the permanent abandonment of the service at the main is completed in a timely manner.

3.2.1.6.2 Any service line that is not abandoned at the main shall be subject to separate “availability” or “ready to serve” charges in the interim period until properly abandoned.

3.2.1.6.3 Sanitary lines made inactive in this manner shall be marked with a marker post placed 1 ft. from the end of the pipe and extending from the pipe to 3 ft. above the ground surface and painted a brilliant green color.

3.2.1.6.4 The location of the terminal pipe locations shall be surveyed or otherwise “tied” to permanent objects that will remain undisturbed at the site, with an as-built drawing provided to the Village Engineer and Wastewater Utility for record purposes.

3.2.2 SANITARY SEWER

3.2.2.1 All sanitary lines shall be abandoned at the street main fitting by disconnecting and removing 2 - 3 ft. of pipe and installing a water-tight cap or plug at the main fitting and on the abandoned line.

3.2.2.1.1 For Poly Vinyl Chloride (PVC) gasketed fittings, a Spigot Plug shall be installed.

3.2.2.1.2 A cured in-place plug will be allowed to abandon services deemed by the Utility to be 100% effective.

3.2.2.1.3 For PVC solvent weld or glued joint fittings, a gasketed Cap shall be installed on an undisturbed and undamaged max. 1.0 ft. spool piece.

3.2.2.1.4 For Concrete, Vitrified Clay, ABS/Truss, DIP or CIP (NOT soil pipe), a PVC Spigot Plug shall be installed using the appropriate Fernco Strong Back coupling onto an undisturbed and undamaged max. 1.0 ft. spool piece.

3.2.2.1.5 All Cast Iron Soil Pipe shall be removed and ONE of the above procedures used.

3.2.2.1.6 If connection to the main is via a “break-in”, then an appropriate length of main shall be cut and removed, with an identical length of PVC SDR 35 or 28 installed using appropriate couplings.

3.2.2.1.7 “Buffalo type” saddles are not acceptable for concrete and PVC pipe materials. Use of solvent weld or glued caps or plugs will not be acceptable.

3.2.2.2 Sanitary or other special manholes or structures that are part of an abandoned system shall also be abandoned by removing the casting, chimney and cone or corbel sections, followed by plugging the outlet and inlet pipe(s) with non-shrink cementitious grout.

3.2.2.3 The manhole barrel shall be filled with crushed stone compacted to 95% minimum standard Proctor density.

3.2.2.4 The property owner shall be responsible for proper disposal of all manhole components removed. All waste materials shall be removed from pipelines and structures before abandonment.

4 STORM SEWER SYSTEM

All labor and material provided under this contract shall be governed by the latest edition and all amendments thereto of the Standard Specifications for Sewer and Water Construction in Wisconsin (SWS) and State of Wisconsin Department of Transportation Standard Specifications for Road and Bridge Construction, unless otherwise specified in these Specifications, whichever is more restrictive. A full-time inspector is required to be at the project site to observe pipe unloading, inspect construction materials, and observe and document the construction of storm sewers and laterals. THESE STANDARDS SHALL APPLY TO ALL PUBLIC STORM SEWERS. Any and all modifications to these Specifications shall be approved by the Village Engineer.

Design shall follow SWS Specifications, Milwaukee Metropolitan Sewerage District (MMSD) Rules, Village of Germantown Municipal Code Chapter 27 and be designed in accordance with the NOAA Atlas 14. For private property in new development, if Department of Commerce procedures are used, the designer shall verify that off-site flows meet all of the requirements of the Rational Method or TR-55 Method. Design shall also conform to the following:

4.1 SPECIFICATIONS

4.1.1 STORM SEWER PIPE

4.1.1.1 MATERIALS

4.1.1.1.1 All storm sewers shall be constructed with a minimum Class III reinforced concrete pipe per SWS, Section 8.6.0 or as approved by Village Engineer:

4.1.1.1.2 Reinforced Concrete Pipe – ASTM C76

4.1.1.1.3 Horizontal Elliptical Reinforced Concrete Pipe – ASTM C507.

4.1.1.1.4 Joints for concrete storm sewer pipe shall have rubber gaskets conforming to SWS, Section 8.41.2.

4.1.1.2 DESIGN STANDARDS

4.1.1.2.1 Minimum size: 12"

4.1.1.2.2 Location:

4.1.1.2.2.1 In streets and easements: 10 feet west or south of the sanitary sewer.

4.1.1.2.3 Pipe cover:

4.1.1.2.3.1 3 feet minimum from finish design grade to outside top of storm sewer.

4.1.1.2.4 Storm sewers with diameters greater than 24" equivalent, daylighting in ditches shall have safety grates, meeting design standards, installed at the upstream and downstream ends.

4.1.1.2.5 Mainline and conveyance storm sewer design storm: 25-yr.; Storm sewers may not be surcharged in a 25-yr. or less design storm condition. Surge condition is defined as to the crown of pipe (full pipe flow - no pressure).

4.1.1.2.6 Minimum slope shall be 0.2% and achieve minimum velocity = 2.0 feet per second when pipe is flowing half-full. Village Engineer may waive the 0.2% minimum slope for runs of pipe longer than 400 feet. Village Engineer may limit maximum velocities.

4.1.1.2.7 Complete sewer design calculations are required with submittals, including Drainage Areas Map.

4.1.1.2.8 Storm sewer shall be required in public Rights-of-Way in new developments where the depth of proposed ditches exceed 3 feet as measured from the edge of pavement.

4.1.2 STORM LATERALS (From main to lot line)

4.1.2.1 MATERIALS

4.1.2.1.1 Unless otherwise specified, all pipe used for storm laterals shall be:

4.1.2.1.1.1 Class III concrete sewer pipe; or

4.1.2.1.1.2 PVC (SDR 26) pipe

4.1.2.2 DESIGN STANDARDS

4.1.2.2.1 Minimum size in ROW/easement areas shall be 6" diameter.

4.1.2.2.2 The minimum slope on laterals shall be 1/8" per foot.

4.1.2.2.3 The maximum slope on laterals shall be 1/2" per foot.

4.1.2.2.4 Minimum cover for storm sewer laterals in paved areas shall be 12" as measured from the top of the pipe to the top of the subgrade.

4.1.2.2.5 A clay dam across the trench shall be constructed adjacent to pavement low points with all storm sewer laterals.

4.1.2.2.6 Connection of laterals to storm sewer shall be subject to following:

4.1.2.2.6.1 Location of invert of new lateral may be permitted a maximum of 12" above spring line of outlet sewer or use outside drop inlet per SWS for main sewers.

4.1.2.2.6.2 Hole - Core drill only. Deliver "cut-out" to the Construction Inspector.

4.1.2.2.6.3 Connection Device - Kor-N-Seal boot, or pre-approved equal with stainless steel snap-in ring.

4.1.2.2.6.4 Any lateral that is connected into a manhole shall have a smooth concrete bench/channel placed to convey lateral flow into the storm sewer.

4.1.2.2.7 Storm sewer lateral lines shall be designed to receive the storm water runoff from window wells, footing drains and sump pumps.

4.1.2.2.8 In areas with storm sewer, a storm sewer lateral shall be provided for each lot or building. The Village Engineer may waive this requirement for lots that are adjacent to and drain to adjacent public drainage easements, wetlands or waters of the State.

4.1.2.2.9 Sump discharges for all buildings shall be located at the front of building (facing street). Village Engineer may waive this requirement for lots that are adjacent to and drain directly to public drainage easements, wetlands or waters of the State.

4.1.2.2.10 Storm laterals shall be located to the right of sanitary sewer lateral when looking from the street.

4.1.2.2.11 Covers installed on lateral cleanouts shall not be bolted to the cleanout pipe.

4.1.3 CULVERTS

4.1.3.1 MATERIALS

4.1.3.1.1 Culverts shall be manufactured and installed in accordance with the requirements of the Standard Specifications for Highway and Bridge Construction in Wisconsin.

4.1.3.1.2 Damaged or rusted culvert pipes shall not be reused.

4.1.3.2 DESIGN STANDARDS

4.1.3.2.1 Culverts located in a Primary Storm Water Management System (PSMS) shall provide at least the 100-year level of protection for capacity and road overtopping.

4.1.3.2.2 Culverts located in a minor storm water management system shall be designed to safely convey surface water runoff from a 10-year storm event. Culverts may not be surcharged in a 10-year or less design storm condition. Surge condition is defined as to the crown of pipe (full pipe flow – no pressure).

4.1.3.2.3 Minimum size shall be 12" diameter for driveways and 15" for roadway cross culverts.

4.1.3.2.4 Minimum culvert lengths:

< 24" diameter	20 feet
24" – 30" diameter	22 feet
36" – 42" diameter	24 feet
48" and larger diameters	26 feet

4.1.3.2.5 Culverts less than 24 feet in length shall consist of one piece of pipe.

4.1.3.2.6 All crossroad culverts shall be designed to provide a minimum of 12 inches of cover to the top of the pipe at the edge of the finished pavement of the road.

4.1.4 FLARED END SECTIONS

4.1.4.1 MATERIALS

4.1.4.1.1 The end sections shall be manufactured and installed in accordance with the requirements of the WisDOT Standard Specifications, Section 521 or Section 522 as applicable.

4.1.4.2 DESIGN STANDARDS

4.1.4.2.1 In areas with greater than 35 miles per hour, flared end sections shall be required to be installed on the ends of driveway culvert.

4.1.5 DITCHES

4.1.5.1 DESIGN STANDARDS

4.1.5.1.1 Slopes.

4.1.5.1.2 Grassed Invert

4.1.5.1.2.1 1½% minimum

4.1.5.1.2.2 4% maximum

4.1.5.1.3 Concrete Invert:

4.1.5.1.3.1 Greater than 4% or less than 1½%.

4.1.5.1.3.2 10 % maximum, 0.7% minimum.

4.1.5.1.3.3 Invert shall be placed on a minimum of 3" of crushed aggregate base course.

4.1.5.1.3.4 Place sod within the initial 1½ feet of ditch side slopes adjacent to the concrete invert.

4.1.5.1.3.5 2-ft. minimum width, v-bottom

4.1.5.1.3.6 V-bottom formed by 4H:1V sloped top surface

4.1.5.1.3.7 Minimum concrete thickness: 6"

4.1.5.1.4 Alternative methods may be used after approval of the Village Engineer is obtained.

4.1.5.1.5 Fore slope: 4H:1V maximum.

4.1.5.1.6 Backslope: 4H:1V maximum.

4.1.5.1.7 The minimum ditch depth shall be 12" below the shoulder point at roadway high points. Other ditch locations shall have a minimum depth of 20" below the shoulder point and be graded to accommodate a properly sized driveway culvert.

4.1.5.1.8 Adopt and administer the WDNR Technical Standards 1053, 1058, and 1059 for erosion control. All roadside ditches shall be covered with a minimum of 4" of topsoil, and either seeded, fertilized and matted or sodded. Sod placement shall be required on longitudinal slopes greater than 4%

4.1.5.1.9 If the back slope of a ditch extends beyond the right-of-way, drainage easements shall be required adjacent to the street right-of-way at a uniform distance from the road centerline or pipe to be buried within right-of-way as to avoid encroaching on private property, as approved by the Village Engineer.

4.1.5.1.10 Turf reinforcement may be used as a substitute for concrete invert in ditches with slopes between 4% - 5%. Village Engineer shall pre-approve turf reinforcement type.

4.1.6 STORM MANHOLE & JUNCTION CHAMBERS

4.1.6.1 MATERIALS

4.1.6.1.1 All storm manholes shall be pre-cast concrete with integral base, with pre-cast flattops (slab or deck) with an opening for the casting.

4.1.6.1.2 The manholes shall be sized as follows:

Downstream Pipe O.D.*	Minimum Manhole I.D.
27" or less	42"
28" – 30"	48"
31" – 36"	60"
37" – 42"	72"
>42"	Special Design Requiring Village Engineer Approval
*O.D. is the largest horizontal outside pipe dimension	

4.1.6.1.3 Where field conditions allow, the manhole shall be constructed with an offset cone.

4.1.6.1.4 All chimney joints, including the frame-chimney joint, and all barrel & cone section lifting holes shall be sealed with a cementitious grout with a struck joint. Grout shall be premixed, non-metallic, high-strength, non-shrink, Pennegrout. by IPA Systems, or approved equal, which meets requirements of ASTM C-1-91 and C-827 as well as CRD C-588 and C-621. When mixed to a mortar or "plastic" consistency, the grout shall have a minimum 1-day and 28-day compressive strength of 6,000 and 9,000 psi, respectively. Dry stacking of riser rings or flat decks shall not be permitted. They shall be laid in a bed of grout as described above.

4.1.6.1.5 Steps meeting the requirements of SWS, Section 6.40.1 shall be installed in all manholes or junction chambers deeper than 4', from floor to rim.

4.1.6.1.6 Drop pipes or other energy-dissipating structures shall be provided for all sewers entering a manhole with their invert at an elevation more than 24" above the invert of the sewer leaving the manhole.

4.1.7 CATCH BASINS

4.1.7.1 MATERIALS

4.1.7.1.1 Shall consist of masonry, pre-cast or monolithic construction in accordance with Chapter 3.6.1 and File No. 25 or 26 of SWS. All catch basins shall be designed and constructed to allow easy access for maintenance and cleaning.

4.1.7.1.2 Steps meeting the requirements of SWS shall be installed in all catch basins deeper than 4', from floor to rim.

4.1.7.1.3 Size (minimum).

4.1.7.1.3.1 For mountable curb, use Neenah castings 3501 Rectangular 24" x 30" (Internal Dimensions).

4.1.7.1.3.2 For vertical face curb, use Neenah casting 3228 Rectangular 24" x 36" (Internal Dimensions).

4.1.7.1.3.3 Round 48" ID.

4.1.7.1.3.4 Manhole inlets - Allowed only in cases where an angle point in the storm sewer occurs under the curb line. (These shall be avoided whenever possible.)

4.1.7.1.4 A continuous 4" diameter perforated, corrugated polyethylene drainpipe, meeting the requirements of AASHTO Designation: M-252, shall be installed under the curb and gutters and extend 50 feet in either direction from storm water catch basins located at low points. For catch basins in other locations, the 50-ft length of drainage pipe shall be connected only to the upstream side.

4.1.7.1.5 Where underdrain pipe is specified, a 4" diameter hole shall be cored in opposite sides of each catch basin located at low points to allow the connection of 4" diameter perforated, corrugated polyethylene underdrain pipe. Catch basins located in other locations shall have a 4" diameter hole cored in the upstream side to allow the connection of 4" diameter underdrain pipe. The holes shall be cored at an elevation that is below the subgrade elevation to allow for positive drainage and proper placement of the underdrain. Village Engineer may waive underdrain requirement.

4.1.7.1.6 All chimney joints, including the frame-chimney joint, and all barrel & cone section lifting holes shall be sealed with a cementitious grout bed with a struck joint. Grout shall be premixed, non-metallic, high-strength, non-shrink, Pennegrout, by IPA Systems, or approved equal, which meets requirements of ASTM C-1-91 and C-827 as well as CRD C-588 and C-621. When mixed to a mortar or "plastic" consistency, the grout shall have a minimum 1-day and 28-day compressive strength of 6,000 and 9,000 psi, respectively.

4.1.7.2 DESIGN STANDARDS

4.1.7.2.1 Inlet capacity design storm: 25-yr. storm event. In a 25-yr. storm event, the maximum spread of ponded storm water shall be 8 feet as measured from the face of curb.

4.1.7.2.2 Inlet capacity design storm: 50-yr. storm event for areas with no overland flow relief. In roadways, storm water ponding shall not exceed 6" on paved parking areas and 4" at the centerline in a 100-yr. storm event.

4.1.7.2.3 At low points, curb pan shall be pitched a ½ inch five feet on both sides of catch basins.

4.1.7.2.4 Where only front yard drainage flows to the curb, maximum separation or run to a catch basin is 300 feet unless in the opinion of the Village Engineer a lesser distance is required. Where the collective drainage from more than one lot discharges over the curb at a single point, a catch basin shall be required at the lot line extended

4.1.8 FIELD INLETS

4.1.8.1 MATERIALS

4.1.8.1.1 Shall consist of masonry, pre-cast or monolithic construction in accordance with Chapter 3.6.3 and File No. 28 or 29 of SWS.

4.1.8.1.2 Inlets shall be designed and constructed to allow easy access for maintenance and cleaning.

4.1.8.1.3 All chimney joints, including the frame-chimney joint, and all barrel & cone section lifting holes shall be sealed with a cementitious grout bed with a struck joint. Grout shall be premixed, non-metallic, high-strength, non-shrink, Pennegrout. by IPA Systems, or approved equal, which meets requirements of ASTM C-1-91 and C-827 as well as CRD C-588 and C-621. When mixed to a mortar or "plastic" consistency, the grout shall have a minimum 1-day and 28-day compressive strength of 6,000 and 9,000 psi, respectively.

4.1.8.2 DESIGN STANDARDS

4.1.8.2.1 Inlet capacity design storm: 25-yr. storm event. In a 25-yr. storm event, the maximum spread of ponded storm water shall be 8 feet as measured from the face of curb.

4.1.8.2.2 Inlet capacity design storm: 50-yr. storm event for areas with no overland flow relief. In roadways, storm water ponding shall not exceed 6" on paved parking areas and 4" at the centerline in a 100-yr. storm event.

4.1.9 ROAD UNDERDRAINS

4.1.9.1 MATERIALS

4.1.9.1.1 Underdrain systems shall be installed under curb and gutters to collect water and convey it to catch basins.

4.1.9.1.2 The underdrain system shall be constructed with:

4.1.9.1.2.1 4" diameter perforated, corrugated polyethylene drainage pipe meeting the requirements of AASHTO Designation: M-252.

4.1.9.1.2.2 Pipe perforations may be holes or slots and may be in 3 or 4 lines spaced around the circumference of the pipe at 120° or 90° respectively.

4.1.9.1.3 The trench shall be backfilled with open graded ¾" crushed stone.

4.1.9.1.4 Geotextile fabric, as specified in Section 612.2.8 of the Standard Specifications, shall be used to line the underdrain trench before the drainage pipe is installed and backfilled. Enough fabric shall be provided as to cover the sides and bottom of the trench and overlap across the top of the trench by a minimum of 4 inches.

4.1.9.2 DESIGN STANDARDS

4.1.9.2.1 The 4" drainage pipe shall be laid in an 8" deep by 8" wide trench with flat bottom with square sides as shown in the Figure 7 of the Details. The trench, constructed at an elevation lower than the base course, shall extend 50 feet in either direction from a storm water catch basin located at the low point of the road, aligned with the proposed centerline of the flange of the curb and gutter. For catch basins in other locations, the 50' drainage pipe shall be connected only to the upstream side.

4.1.9.2.2 The drainage pipe shall be connected to catch basins in cored holes and grouted in-place in the cored holes. The end of drainage pipe opposite the catch basin shall be capped with a cap suitable for installing on the drainage pipe.

4.1.10 BEHIND CURB COLLECTORS

4.1.10.1 MATERIALS

4.1.10.1.1 All behind the curb collector systems shall be constructed with minimum 6" diameter PVC (SDR 35) pipe.

4.1.10.1.2 The clean out shall consist of a standard pre-cast 24" x 36" box inlet with a Neenah R-1878-B7L frame and lid as shown in Figure 15 of the Details.

4.1.10.2 DESIGN STANDARDS

4.1.10.2.1 Connected to sump pump drainage lines in lieu of storm sewer.

4.1.10.2.1.1 36" from flow line to surface.

4.1.10.2.1.2 1 % minimum grade.

4.1.10.2.1.3 300-ft. maximum run to outlet.

4.1.10.2.1.4 Maximum run of 250 feet in curvilinear street.

4.1.10.2.1.5 Maximum of 4 lots contributing area.

4.1.10.2.2 Behind the curb collector systems shall be installed 2' behind the curb at cul-de-sacs and hill crests where storm sewers are not located.

4.1.10.2.3 The collector pipe shall be connected to the nearest catch basin.

4.1.10.2.4 A clean out shall be installed at the upstream end of the collector system.

4.1.10.2.5 Sump lines for lots not served by the storm sewer shall be connected to the PVC collector pipe by a wye or tee fitting.

4.1.10.2.6 Tracer wire installation is required on all behind the curb collector pipe.

4.1.11 FRAMES, GRATES AND LIDS

4.1.11.1 MATERIALS

4.1.11.1.1 Vertical curb catch basin frames and grates shall be

4.1.11.1.1.1 Neenah R-3228-K, (with Rectangular 24" x 36" structure).

4.1.11.1.1.2 or equal as pre-approved by the Village Engineer.

4.1.11.1.2 Driveway frame and grate shall be 3290-A.

4.1.11.1.2.1 Mountable curb catch basin frames and grates shall be:

4.1.11.1.2.2 Neenah R-3501-R, (with Rectangular 24" x 30" structure).

4.1.11.1.2.3 or equal as pre-approved by the Village Engineer. (Add a flat frame and grate for driveway curb head reductions)

4.1.11.1.3 Field inlet frames and grates shall be:

4.1.11.1.3.1 Neenah R-3210-A, (with 35" x 35" structure).

4.1.11.1.3.2 or equal as pre-approved by the Village Engineer.

4.1.11.1.3.3 A Neenah R-2561 series beehive frame and grate shall be used where required by the Village (with 30" OD structure).

4.1.11.1.4 Manhole frames and grates in field inlet applications shall be:

4.1.11.1.4.1 Neenah R-2577-1, or

4.1.11.1.4.2 equal as pre-approved by the Village Engineer.

4.1.11.1.5 Manhole frames and lids in pavement applications shall be:

4.1.11.1.5.1 Neenah R-1661, or

4.1.11.1.5.2 equal as pre-approved by the Village Engineer.

4.1.11.1.6 Covers shall have machined bearing surface and will be permitted to have eight (8) vent holes.

4.1.11.1.7 A pipe grate with maximum opening size of 6" shall be installed on storm sewer inlets 18" or larger. Grate shall be hot-dipped galvanized after fabrication or be constructed of corrosion resistant material approved by Village Engineer.

4.1.12 FRAME ADJUSTMENTS

4.1.12.1 MATERIALS

4.1.12.1.1 All frame/casting adjusting rings for manholes, catch basins and inlets shall be:

4.1.12.1.2 Pro-Ring™ by Cretex, or

4.1.12.1.3 approved equal

4.1.12.1.4 The minimum for a chimney section shall be the height associated with the proper placement of one 2" adjusting ring. The maximum height of adjusting rings above the cone or slab top is 16 inches as measured from the top of cone or slab top. If more than 16 inches of adjusting rings are needed to set the casting to finished grade, then an additional barrel section shall be installed on the manhole.

4.1.12.1.5 The minimum thickness of individual pre-cast concrete adjusting rings shall be a nominal 2". The maximum thickness shall be a nominal 4".

4.1.13 SUMP PUMPS, DOWN SPOUTS, AND ROOF DRAINS

4.1.13.1 DESIGN STANDARDS

4.1.13.1.1 Sump pumps shall be connected to a storm sewer system if one exists adjacent to the lot.

4.1.13.1.2 Down spouts and roof drains, if not buried, may be connected to a sump collector. If buried, they shall be connected to sump collector.

4.1.13.1.3 If storm sewer is not provided or if a rural roadway section exists, then sump pumps shall be installed to receive and discharge ground water from footing drains.

4.1.13.1.4 Sump pumps, down spouts and roof drains shall discharge on the ground to the front of the lot so that:

4.1.13.1.4.1 Adjoining properties are not adversely affected.

4.1.13.1.4.2 If no drainage easement exists along a side or rear lot line, the discharge point within the site, shall be at least 10' from the lot line.

4.1.13.1.4.3 If a public open drainage easement exists adjacent to any lot, the discharge point for down spouts and/or roof drains shall be discharged directly into the easement.

4.1.14 BEDDING/COVER/BACKFILL

4.1.14.1 MATERIALS

4.1.14.1.1 Pipe Bedding/Cover: In accordance with SWS as follows -

4.1.14.1.1.1 Flexible wall pipe shall be Class "B" up to 12" above the top of pipe; 3/8" limestone chips.

4.1.14.1.1.2 Rigid wall pipe with diameters equal to or less than 21" shall have 3/8" limestone chips up to 6" above the top of pipe.

4.1.14.1.1.3 Rigid wall pipe with diameters greater than 21" shall have 3/4" limestone chips up to 6" above the top of pipe.

4.1.14.1.2 Cover Material: In accordance with SWS, Section 8.43.3. No stone, rock or other similar material with a sieve size greater than 1" shall be permitted.

4.1.14.1.3 Granular Backfill: In accordance with SWS, Section 8.43.4. No stone, rock or other similar material with a sieve size greater than 3" shall be permitted. Granular material shall be crushed limestone.

4.1.14.1.4 Spoil Backfill: In accordance with SWS, Section 8.43.5. No stone, rock or other similar material with a sieve size greater than 3-inches shall be permitted. In areas where excavated material(s) are determined to be not acceptable, in the judgement of the Village Engineer, then imported backfill material meeting the requirements of SWS will be required.

4.1.14.1.5 Slurry Backfill: Aggregate slurry in accordance with SWS, Section 8.43.8 and requirements of the Village Engineer, or in accordance with street opening permit, when issued. In special cases, the Village Engineer may direct the use of Sand Slurry consisting of 50 pounds of fly ash and a 1/2 bag of Portland cement per cubic yard of mix.

4.1.14.2 DESIGN STANDARDS

4.1.14.2.1 Backfill in accordance with all street opening permit(s), generally this will be aggregate slurry. All areas greater than 5 ft from a paved surface (and above a 45-degree intercept line) may receive suitable spoil backfill as provided herein.

4.1.14.3 INSTALLATION

4.1.14.3.1 Care shall be taken by the Contractor when backfilling to prevent any movement of the pipe from proper alignment and grade. Contractor is responsible for determining that the finished sewer remains at the required elevation and grade.

4.1.14.3.2 Mechanically compact all trench backfill per SWS, Section 2.614(b). The initial lift to be compacted shall have a 2' loose thickness. Each subsequent lift to be compacted shall have a maximum 18" loose thickness. Contractor shall place thinner lifts if the required compaction cannot be achieved.

4.1.15 PIPE TO MANHOLE CONNECTIONS

4.1.15.1 MATERIALS

4.1.15.1.1 In accordance with SWS, Section 3.5.7, except as modified below:

4.1.15.1.2 Amend the last sentence of Section 3.5.7(a) by adding the following: “using boots or cast-in-place cementitious material.”

4.1.15.1.3 Delete the last paragraph of Section 3.5.7 (c) & replace with: “To maintain seal flexibility, the annular space between the pipe and manhole wall shall be plugged with flexible butyl rubber gasket material prior to pouring the manhole invert and bench in accordance with SWS, Section 6.41.6. When connecting pipe to existing pre-cast concrete manholes, core hole in manhole wall prior to installing pipe to manhole seal.”

4.2 INSPECTION

4.2.1 SUBMITTALS AND SAMPLES

4.2.1.1 All materials and installations shall conform to SWS and are subject to the Village Engineer’s approval. All materials of each type or use shall be from a single manufacturer. Contractor shall submit for approval six (6) sets of material specifications, certification and testing results by manufacturer on EACH material item required on the Project.

4.2.2 ACCEPTANCE TESTING

4.2.2.1 General

4.2.2.1.1 Installation shall be in accordance with SWS, and these specifications.

4.2.2.1.2 All storm sewer pipe shall be laid uniformly to line and grade. Noticeable variation from true alignment and grade will be considered, by the Village, sufficient cause for rejection of the work. Care should be taken to ensure that the entering pipe is forced tightly against the last pipe laid.

4.2.2.1.3 Storm sewer, storm sewer inlets, storm sewer catch basins, and lateral alignment shall be uniform in line and grade as measured from the inlet to the outlet of the pipe section. Vertical misalignment of greater than $\frac{3}{4}$ ” in a single pipe section or a crest in the pipe grade extending for more (longer) than one-and-one-half (1-1/2) sections of pipe shall be cause for rejection and correction by the Contractor at no cost to the Village.

4.2.2.1.4 Manhole barrel joint(s) gasket material (“E-Z-Stik”) shall be placed on the vertical slope of each joint and shall be of the size necessary to fill the annular space of the joint. Lifting holes shall be grouted with Pennegrout and struck smooth on the interior and exterior surfaces. Chimney joints shall be grouted with Pennegrout. The grout shall extend the full width of each grade ring and each joint shall be struck-off vertically, even with the inside and outside chimney surfaces.

4.2.2.1.5 Rim elevations for manholes located in paved areas shall be set $3/8'' - 1/2''$ below the asphalt binder grade elevation. Ramping of manholes will not be allowed.

4.2.2.1.6 Final adjustments to raise rim elevations to $1/2''$ below the grades shown on the final paving plans shall be made by installing adjusting rings as needed just prior to placement of the final lift of the pavement (surface course).

4.2.2.1.7 Catch basins shall be initially constructed to approximate $3/4''$ below binder grade prior to the curb and gutter construction. When curb and gutter is constructed, the concrete curb and gutter shall be stopped 5 feet on either side of the inlet. At intersections, catch basins are to be constructed 5 feet from the end of radii (to side of inlet). Temporary curb and gutter in the 5-foot gap on either side of the inlet shall be constructed with asphalt transitioning from the final grades of the concrete curb and gutter to the grade of the grate set at binder grade.

4.2.2.1.8 At the time of placement of the final surface course of pavement, the temporary asphaltic curb and gutter shall be removed, and the inlet frame shall be set to final grade by adding one 2" adjusting ring and applying Type "M" mortar per SWS, Section 6.37.1. The concrete curb and gutter shall be completed. No wood shims shall be left in place. With this method, tuck pointing beneath the frame should not be required.

4.2.2.1.9 Any catch basin out of horizontal alignment by more than 2 inches shall be reconstructed to match the curb and gutter.

4.2.2.1.10 Contractor shall furnish and place a temporary 2" x 6" stake at the end of each storm lateral.

4.2.2.1.11 Existing field tiles shall be connected to a storm sewer or have a positive outfall provided.

4.2.2.1.12 All storm sewers shall be free from debris, sedimentation, or garbage prior to Village acceptance.

4.2.2.1.13 Downspout cleanouts and catch basins shall be inspected by the Village prior to acceptance by the Village.

4.1 INSPECTION

When starting an installation, the farthest downstream location of the new sanitary sewer system shall have a plug installed and maintained by the utility Contractor. That plug shall not be removed until the system has been accepted by the Wastewater Utility Village Engineer and deemed operational by the Village and/or the Utility Department.

4.1.1 SUBMITTALS AND SAMPLES

4.1.1.1 All materials of each type or use shall be from a single manufacturer. Contractor shall submit for approval six (6) sets of material specifications, certification and testing results by manufacturer on EACH material item required on the Project.

4.1.2 ACCEPTANCE TESTING

4.1.2.1 General

4.1.2.1.1 Deflection and Leakage tests in accordance with SWS and under supervision of the Engineering Project Inspector and the Wastewater Utility.

4.1.2.1.2 All sewer pipes shall be laid uniformly to line and grade. Noticeable variation from true alignment and grade will be considered to be sufficient cause for rejection of the work by the Village. Care should be taken to ensure that the entering pipe is forced tightly against the last pipe laid.

4.1.2.1.3 Sanitary main and lateral alignment shall be uniform in line and grade as measured from the inlet to the outlet of the pipe section. Vertical misalignment of greater than $\frac{3}{4}$ " in a single pipe section or a sag in the pipe grade extending for more (longer) than one-and-one-half (1.5) sections of pipe shall be cause for rejection. Any correction by the Contractor shall be at no cost to the Village or Utility.

4.1.2.1.4 Two (2) business days' notice is required to be given to the Village's Inspector and the Wastewater Utility.

4.1.2.1.5 All water that is used for construction purposes will be charged at the current rates for such use. A PERMIT IS REQUIRED FROM THE WATER UTILITY PRIOR TO ANY WATER USE.

4.1.2.2 Tests

4.1.2.2.1 Deflection testing for flexible mains shall be at the 95% of specified minimum I.D.

4.1.2.2.2 Leakage testing shall include all installed system components, such as mains, branches, laterals, risers and taps to the terminus of lines installed. For each foot that the test section is below ground water level, the test pressure shall be increased by 0.43 PSI for each foot that the average ground water height for the test section is above the spring line. In absence of recorded data on ground water table above pipe invert, it shall be assumed to begin at six (6) feet below finished

manhole grade. Therefore, the minimum increase in test pressure shall be 6.6 psi and the maximum test pressure shall be 10.0 psi.

4.1.2.2.3 Sanitary Manholes shall be vacuum tested for leakage in accordance with standard test methods outlined in ASTM C-1244-93 or current edition, and minimum test time periods of:

42" & 48" dia. Manholes	60 sec.
60" dia. Manholes	75 sec.
72" dia. & greater Manholes	90 sec.

4.1.2.2.4 Interior manhole walls to be vacuum tested shall be dry. As required by MMSD, sanitary manholes shall be vacuum tested from the lid down to the invert. If a vacuum test fails, all remedial sealing is to be done on the exterior of the manhole prior to re-testing following proper curing time. Manholes receiving repairs shall be vacuum tested again after repairs are completed.

4.1.2.2.5 As an alternative, sanitary manholes may be vacuum tested from the top of the cone to the invert provided that the frame/cone internal seal and extension, if installed, are water tested during installation as required by MMSD. Reports summarizing the vacuum testing shall be submitted to the Utility Department.

4.1.2.2.6 Follow hydrostatic testing procedures outlined in SWS, Section 4.15, at 100 psi and no leakage.

4.1.2.2.7 Testing of both internal and external seals shall be with a gallon of dyed water behind the seal for a period of 1 minute without any leakage through the bottom clamp.

4.1.2.2.8 Prior to pre-punch list work, tracer wires shall be tested by Contractor prior to Village accepting the work. The Utilities Department has the option to spot check the continuity of the tracer wires.

4.1.2.2.9 As part of the pre-punch list work, Contractor required to notify when CCTV is ready to start. CCTV will be completed by the Village Wastewater Utility at no cost to Contractor.

4.1.3 CLEANING

4.1.3.1 Cleaning Precautions

4.1.3.1.1 During the cleaning process, a mechanical plug of appropriate size will be installed at the furthest downstream manhole, and all efforts shall be made to keep foreign materials and water from adjoining sewer systems.

4.1.3.1.2 Contractor shall clean all sanitary sewer line sections between manholes using high-velocity jet, or mechanically powered equipment. All dirt, sand, rocks, and other solid or semi-solid material resulting from the construction of the system shall be removed before acceptance.

4.1.3.2 Contractor shall be required to repair all visible damage and leaks in the mains.

4.1.3.3 This procedure is in addition to any testing required by SWS and/or MMSD.

4.1.3.4 Acceptance of sewer line cleaning and construction will be made upon the successful completion of the CCTV inspection by the Village, and to the satisfaction of the Wastewater Utility. If the CCTV inspection shows the cleaning to be unsatisfactory, the Contractor shall be required to re-clean and re-inspect the sewer line until the cleaning is shown to be satisfactory. Second inspection by CCTV due to dirt in pipe will be charged to Contractor.

4.1.4 CCTV – Private Interceptor Sewers

4.1.4.1.1 Contractor will perform CCTV after construction is complete. A copy of the CCTV video and report shall be provided to the Wastewater Utility.

4.1.4.1.2 Color videotape recordings of the data shall be made by the Contractor. Copies of each videotape, in USB digital format (USB flashdrives) or approved media, shall be provided to the Wastewater Utility. PipeTech Compatible P.A.C.P. codes are required.

4.1.4.1.3 A set of system map Plan Sheets shall be included with all CCTV report books.

5 ROAD SYSTEM

5.1 GEOMETRICS

5.1.1 RIGHT-OF-WAY WIDTHS

Type	Minimum ROW Width (feet)
Local Street	60
Service Alley	30
Manufacturing and Industrial	80
Collectors and Arterials	Per adopted County Highway Width Map and/or Official Village Map

Per tables 2 & 2A of Chapter 18 of the Village of Germantown Municipal Code

5.1.2 PAVEMENT WIDTHS

5.1.2.1 Pavement widths are measured from edge of pavement to edge of pavement.

Standard Urban Residential Section Using Curb & Gutter (Face of curb to face of curb)	30 Feet
Standard Rural Residential Section With Open Ditches (Face of curb to face of curb)	24 Feet
Standard Commercial or Industrial Section	40 Feet

Per tables 2 & 2A of Chapter 18 of the Village of Germantown Municipal Code

5.1.3 BOULEVARD SECTIONS

5.1.3.1 Entrance

5.1.3.1.1 Minimum pavement width (flange to flange of curb and gutter) shall be 16 feet for a single lane.

5.1.3.1.2 Minimum pavement width (flange to flange of curb and gutter) shall be 24 feet for a double lane.

5.1.3.2 Exits

5.1.3.2.1 Minimum pavement width (flange to flange of curb and gutter) shall be 24 feet (double lane).

5.1.3.2.2 Minimum median width shall be 20 feet back of curb to back of curb.

5.1.3.2.3 Median length shall be adequate for queuing, but generally shall not extend beyond the first side street.

5.1.4 CUL-DE-SACS

5.1.4.1 Local streets open at one end only shall end with a cul-de-sac.

5.1.4.2 No less than 3 parcels and no more than 15 parcels may be served by a cul-de-sac.
Block length between intersections shall not exceed 1,500 feet nor be less than 500

feet. Block length is measured from the center line of the right-of-way to the center line of the right-of-way of the two cross streets.

5.1.4.3 Residential:

5.1.4.3.1 All pavement widths for a standard residential cul-de-sac shall have a minimum bulb radius of 42 feet as measured from the center of the cul-de-sac to the edge of pavement.

5.1.4.3.2 The minimum bulb radius for the Right-of-Way shall be 66 feet as measured from the center of the cul-de-sac.

5.1.4.4 Commercial or Industrial:

5.1.4.4.1 All pavement widths for a standard commercial or industrial cul-de-sac shall have a 48-ft. radius measured from the center of the cul-de-sac to the face of curb.

5.1.4.4.2 The minimum radius for the Right-of-Way shall be 66 feet.

5.1.4.5 Central planting islands are acceptable in the middle of the cul-de-sac.

5.1.4.5.1 Minimum pavement width (edge of pavement to edge of pavement for rural cross-section or flange to flange for curb and gutter) shall be 16 feet for a single lane.

5.1.4.5.2 Plantings should be installed outside of the 5' clear zone for snow plowing.

5.1.5 CLOSE/LOOP STREET

5.1.5.1 The close or loop street, may be used in lieu of a short cul-de-sac, and shall be designed as two parallel lanes, 16-ft. wide lanes separated by a central planting strip or bio-retention area having a minimum width of 50 feet.

5.1.5.2 Maximum length for a close or loop street shall be 1,200 feet.

5.1.6 STREET GRADES

Type	Max Grade
Arterial	4%
Collector	7%
Local	10%

5.1.6.1 Urban roadway sections shall have a minimum of 0.7% centerline profile gradient.

5.1.7 CROSS SLOPE

5.1.7.1 All roadway sections (urban or rural) shall have a crown, with a cross slope of 3% from the pavement centerline to the edge of pavement.

5.1.8 HORIZONTAL CURVES

5.1.8.1 Minimum horizontal curve requirements, per WDOT Geometric Design of Highways and Streets, Current Edition including all updates.

5.1.8.2 Compound Curves

5.1.8.2.1 Compound curves are only allowed on roads with a posted speed limit of 25 mph or less.

5.1.8.2.2 A minimum horizontal curve radius of 250 feet is required along the roadway centerline.

5.1.8.2.3 A horizontal curve radius of 200 feet may be accepted when a 100' long tangent length is provided between curves.

5.1.9 VERTICAL CURVES

5.1.9.1 Maintain "K" Values per AASHTO Geometric Design of Highways and Streets, Current Edition including all updates.

5.1.10 SIGHT DISTANCE

5.1.10.1 For minimum sight distance requirements at intersections and driveways, refer to AASHTO Geometric Design of Highways and Streets, Current Edition including all updates.

5.1.11 INTERSECTION RADII

5.1.11.1 Internal to development for minor streets (measured from the edge of pavement/flange line):

5.1.11.1.1 Residential and multi-family: 25 feet

5.1.11.1.2 Commercial and industrial: 42 feet

5.1.11.1.3 Intersection radii at side roads, shall be as approved by the Village Engineer.

5.1.12 ACCELERATION/DECELERATIONS/BYPASS LANES

5.1.12.1 Any roadway intersecting with a collector or arterial street projected to have more than 100 ADT shall require Acceleration/Decelerations/Bypass Lanes per Detail Figure No. 4.

5.1.13 TRANSITIONS

5.1.13.1 Transitions areas, such as lane additions, bypass lanes, traffic shifting lanes, and areas between existing pavement and new pavement sections with varying widths, shall be transitioned based on speed and road type.

5.2 SPECIFICATIONS

5.2.1 SUBGRADE

5.2.1.1 DESIGN STANDARDS

5.2.1.1.1 Soil borings to a minimum depth of 10 feet below finish grade shall be taken every 50-500 feet along the proposed centerline of the roadway. A site map showing the location of the borings along with laboratory soils classifications for each boring shall be submitted to the Village Engineer.

5.2.1.1.2 Should the geotechnical data submitted to the Village not be sufficient to satisfy the Village Engineer, the Developer shall grant the Village with a right of entry to obtain the required data. Costs associated with obtaining the required data shall be at the Developer's sole expense.

5.2.1.2 INSTALLATION

5.2.1.2.1 The subgrade shall be proof rolled, checked for proper grade and approved by the Village Engineer or designee before crushed stone base and, if necessary geotextile fabric, is to be applied. Proof rolls are to be witnessed by a designated Village representative.

5.2.1.2.2 All earth fills under roadways shall be placed in 12" maximum lifts and a Proof Roll shall be witnessed by the Village Inspector or designated Village representative.

5.2.1.2.3 All soft spots located as a result of proof rolling with a fully loaded tri-axle truck approved by Village Engineer or designee shall be undercut and filled in a manner agreed upon by the Contractor and the Village Engineer.

5.2.1.2.4 All repaired soft spots shall be re-proof rolled after subgrade elevation has been re-established. Process shall be repeated until the project passes proof roll.

5.2.1.2.5 In unstable soil conditions, undercutting in excess of 3 feet shall be backfilled with 3" breaker run or other materials as approved in writing by the Village Engineer. 1-1/4 inch select crushed aggregate may also be used.

5.2.1.2.6 If open graded material is used, drainage at the bottom of the undercut is required by use of a French drain or perforated pipe bedded in crushed stone, where grades allow. In many situations, dense graded coarse TB shall be used to eliminate water that would be trapped if clear stone was used.

5.2.1.2.7 In unstable soil conditions, additional subdrains may be required as directed by the Village Inspector.

5.2.1.2.8 Method of drainage of the filled area shall be approved by the Village Inspector.

5.2.2 GEOTEXTILE FABRIC

5.2.2.1 MATERIAL

5.2.2.1.1 Geotextile fabric conforming to WisDOT Standard Specification, Section 645 shall be pre-approved by the Village Engineer prior to installation for:

5.2.2.1.1.1 subgrade separation and stabilization (Type SAS)

5.2.2.1.1.2 drainage filtration (Type DF)

5.2.2.1.1.3 subgrade reinforcement (Type SR)

5.2.2.1.1.4 under riprap (Types R & HR).

5.2.2.2 INSTALLATION

5.2.2.2.1 Geotextile fabric shall be placed on substandard subgrade in all areas that will receive crushed aggregate base course material, unless a Clear Stone Frost Barrier is to be used. Geotextile fabric is not required where Clear Stone Frost Barrier is to be used.

5.2.2.2.2 Geotextile fabric shall have a minimum 24" overlap for longitudinal seams and minimum 36" overlap for transverse seams.

5.2.2.2.3 Subsequent open cuts of the pavement requiring excavations below the subgrade of roadways having geotextile fabric in place shall be backfilled with approved slurry.

5.2.3 BASE COURSE

5.2.3.1 MATERIALS

5.2.3.1.1 The crushed aggregate base course for the roadway shall consist of dense graded base conforming to WisDOT Standard Specification Section 305.2.2.1 for 1 ¼-inch.

5.2.3.2 INSTALLATION

5.2.3.2.1 The finished base course elevation shall be a minimum of:

5.2.3.2.1.1 10" above the approved subgrade for a local roadway,

5.2.3.2.1.2 14" above the approved subgrade for a commercial or industrial roadway

5.2.3.2.2 New Construction or Reconstruction:

5.2.3.2.2.1 Bottom Layer: 3" gradation crushed interlocking limestone aggregate from a quarry source

5.2.3.2.2.2 Middle Layer: 1 ¼" gradation crushed interlocking limestone aggregate from a quarry source

5.2.3.2.2.3 Quarry Source: Quarry source shall be listed on the WisDOT Pit and Quarry Listing (latest edition) and be approved by Germantown.

5.2.3.2.2.4 Gradations shall conform to WisDOT Standard Specifications Sec. 305

5.2.3.2.3 Pulverize & Overlay: Pulverized pavement acceptable when recommended by Geotechnical Services Report, as approved by the Village Engineer.

5.2.3.2.4 The dense graded base shall be spread, shaped, compacted, and proof-rolled to produce a stabilized base which conforms to the required cross-sections.

5.2.3.2.5 Special compaction testing may be required dependent on-site conditions in accordance with 301.3.4.3 of the WisDOT Standard Specifications at the contractor's expense.

5.2.3.2.6 Surface Elevation tolerance to be +/- 1/2 inch.

5.2.3.2.7 Base course to be compacted to 95% Modified Proctor and conform to WisDOT Standard Specification 305.3.2

5.2.4 FROST BARRIER – As required by the Village Engineer

5.2.4.1 MATERIALS

5.2.4.1.1 The Frost Barrier shall be #3 Clear Stone with a minimum depth of 12" or as specified for a given project.

5.2.4.2 DESIGN STANDARDS

5.2.4.2.1 Where specified by the Village, a layer of Clear Stone Frost Barrier shall be required to prevent or minimize future frost heave damage to the roads.

5.2.5 SHOULDERS

5.2.5.1 MATERIALS

5.2.5.1.1 The aggregate for shoulder shall consist of: Crushed stone conforming to WisDOT Standard Specification Section 305.2.2.1 for ¾-inch dense graded base; or Recycled asphalt as approved by the Village Engineer.

5.2.5.2 DESIGN STANDARDS

5.2.5.2.1 For rural cross sections, a minimum 4-ft. wide shoulder shall be constructed, with recycled asphalt, along both edges of pavement.

5.2.6 ASPHALT PAVEMENT

5.2.6.1 MATERIALS

5.2.6.1.1 Asphalt pavement materials shall conform to the requirements of the Wisconsin Asphalt Pavement Association's (WAPA) latest pavement design guide.

5.2.6.1.2 Mix designs for all other classifications shall be as approved by the Village Engineer.

5.2.6.2 INSTALLATION

5.2.6.2.1 All asphalt binder courses shall be constructed on a dry, rolled and compacted crushed stone base, free of loose and foreign materials. Hand operated vibrating compactors shall be used around all manholes and valve boxes.

5.2.6.2.2 A tack coat, meeting the requirements of WisDOT Standard Specification Section 455.2.5, shall be used as a bonding agent between binder and surface courses, and the separate lifts of binder when not placed on the same day. The binder surface

shall be thoroughly cleaned and any debris removed prior to applying the tack coat. Tack coat shall be uniformly applied at a rate of 0.07 gallon per square yard with an allowable variation of +/- 0.02 gallon per square yard over the entire receiving surface. Daily application of the tack coat shall be limited to approximately that area of surface that can reasonably be expected to be paved during the same day.

5.2.6.2.3 Saw cutting

5.2.6.2.3.1 When saw cutting existing concrete or asphalt pavements, curb and gutter, driveways, or sidewalks, the saw cut shall be straight, and shall be full depth.

5.2.6.2.3.2 No payment shall be made for sawing that is not straight or for sawing where the sawing debris is not washed off of the pavement or driveways.

5.2.6.2.3.3 Longitudinal joints in the surface course shall at no time be placed immediately over similar joints in the binder course beneath, with the exception of the centerline. A minimum distance of 6" shall be required between the location of the joints in any given course and the location of similar joints in the course placed above it unless approved by the Village Engineer.

5.2.6.2.4 Paving shall be done in stages so that the first pass does not cool below 125° F, prior to second pass of the next lane.

5.2.6.2.5 Any asphalt paving after October 15th of any year shall be done only with special, alternate methods approved by the Germantown Village Engineer.

5.2.6.2.6 If the roadway will not receive the final lift prior to October 15th, a minimum 18" wide wedge of asphalt shall be placed against the flange line for protection.

5.2.6.2.7 On roadways with rural cross-section, the edge of the pavement shall be sloped, and no materials shall extend beyond the limits of the previous layer. Irregularities in alignment along the outside edges shall be corrected by adding or removing asphalt. Excess asphalt deposited on the existing base, binder or surface course outside the limits of the lane being laid, shall be immediately removed.

5.2.6.2.8 Prior to placement of the surface course:

5.2.6.2.8.1 All foreign matter shall be removed from the binder course surface.

5.2.6.2.8.2 On streets with curb and gutter, the 18" wide wedge of protective asphalt previously placed against the curb and gutter shall be removed by milling.

5.2.6.2.8.3 Developer/Contractor, at his sole expense, shall repair any depressions or other signs of failure in the binder course as directed by the Village Engineer.

5.2.6.2.8.4 Developer/Contractor, at his sole expense, shall repair any damaged curb and gutter as directed by the Village Engineer.

5.2.6.2.8.5 All manhole rims and water valve boxes shall be left 3/8" -1/2" below binder course and adjusted to 3/8" -1/2" below the final pavement elevation prior to

placement of surface course of asphalt. Paving rings which have an adjustable diameter are not allowed.

5.2.6.2.9 All excavations associated with manhole adjustments shall be backfilled with slurry as specified in Standard Specification for Sewer and Water Construction in Wisconsin Section 8.43.8. The slurry shall be backfilled to 6-inches below the final pavement elevation for residential, commercial, and industrial streets.

5.2.6.2.10 Asphalt pavement installation will not be permitted after October 15th unless approved by the Village Engineer.

5.2.6.2.11 Asphaltic binder course shall not be installed after October 1st, unless approved by the Village Engineer.

5.2.6.2.12 Asphaltic surface course shall be installed in the same calendar year as the binder course, unless approved by the Village Engineer.

5.2.7 CONCRETE PAVEMENT

The use of concrete pavement requires the approval of the Village Engineer.

5.2.7.1 MATERIALS

5.2.7.1.1 Portland Cement and aggregates used in all concrete mixes shall conform to WisDOT Standard Specification Section 501.

5.2.7.1.2 Aggregates used in concrete shall conform to the requirements of WisDOT Standard Specification Section 501.

5.2.7.1.3 Concrete shall be air entrained, Grade A, conforming to WisDOT Standard Specification Section 501, and in particular, meet the following requirements:

5.2.7.1.3.1 Minimum concrete content, 6.0 sacks per cubic yard;

5.2.7.1.3.2 Compressive strength after 28 days cured: 4,000 psi;

5.2.7.1.3.3 Maximum amount of water per bag of cement: 6.0 gallons;

5.2.7.1.3.4 Size of course aggregates required: No. 1 plus No. 2;

5.2.7.1.3.5 Slump: 1"-3"; and

5.2.7.1.3.6 Air content: 4.5% - 7.5%.

5.2.7.2 DESIGN STANDARD

Pavement Thickness (in)	Dowel Bar Dia. (in)	Joint Spacing (ft)
5 ½, 6, 6 ½	None	12
7, 7 ½	1	14
8, 8 ½	1 ¼	15
9, 9 ½	1 ¼	15
10 and above	1 ½	15

5.2.7.2.1 Alternative designs, such as high early, shall be as approved by the Village Engineer.

5.2.7.3 INSTALLATION

5.2.7.3.1 Contractor shall submit a mix design 10 days prior to paving and receive the approval of the Village Engineer.

5.2.7.3.2 A pre-pour meeting shall be scheduled with the Village's Engineering Department prior to paving.

5.2.7.3.3 Water used shall conform to WisDOT Specification Section 501.2.4. If Village water is used, it will be charged at the current rates for such use; a PERMIT IS REQUIRED from the Water Utility for any Village water use.

5.2.7.3.4 The consistency of the concrete shall be such that when measured by means of a 4" x 8" x 12" slump cone, the slump shall not exceed 3".

5.2.7.3.5 Test cylinders shall be required meeting AASHTO standards, stored under site conditions and then tested at Contractor expense. Testing to be performed by a licensed geotechnical consultant i.e. third party must make and test cylinders. Three test cylinders per 1,000 lineal feet shall be taken during the course of the curb and gutter operations. A testing firm, hired by the Developer, shall pick up the cylinders at the project site within 24 hours of paving, break the cylinders at the appropriate time (7, 14, and 28 days) and submit a test report to the Developer. The Developer shall submit a copy of the report to the Village Engineer or designee.

5.2.7.3.6 Concrete pavement shall be constructed in accordance with WisDOT Standards Specifications, Section 415.

5.2.7.3.7 Curing Time and Cleanup

5.2.7.3.8 Concrete pavements shall be closed to all traffic for 7 days unless otherwise directed by the Village Engineer. When directed to open the street to vehicular traffic, the Contractor shall clean the area of all forms, lumber, dirt and other debris to the satisfaction of the Village Engineer. The Contractor shall then flush and sweep the street.

5.2.7.3.9 When a concrete saw has been utilized to cut joints, the Contractor will be required to flush the pavement with water, removing all residual materials of the sawing operation, prior to opening the street to vehicular traffic.

5.2.7.3.10 Apply curing agent according to Wisconsin Concrete Paving Association (WCPA) Concrete Pavement and Flatwork Specification Guide.

5.2.7.3.11 Concrete Placement During Cold Weather (Follow WisDOT Specifications)

5.2.7.3.12 Concrete shall not be placed on a frozen subgrade. The Contractor shall remove and replace at his expense any concrete damaged by frost or freezing.

5.2.7.3.13 When placing concrete during cold weather, the water and the aggregates in the concrete mixture may be heated. When specifically allowed by the Village Engineer, the Contractor may use magnesium free calcium chloride as an admixture in the concrete. The maximum quantity to be used shall not exceed 1% of the cement content of the mix.

5.2.7.3.14 When the air temperature is expected to drop below freezing, the Contractor shall cover the surface of the concrete with straw, hay, or blankets to a sufficient depth to prevent freezing and such protection shall be furnished for at least 5 days after the concrete has been poured. Other methods of protection from freezing may be used when approved by the Village Engineer.

5.2.8 ADMIXTURES

5.2.8.1 Water Reducing

5.2.8.1.1 The Contractor may incorporate into the concrete mixture an approved water reducing admixture meeting the requirements of AASHTO Specification M-194, Type A or D when approved by the Village Engineer. The cement content may be reduced to 5.8 sacks per cu. yd. when the admixture is used at the manufacturer's recommended rate.

5.2.8.1.2 Accelerator: When specifically allowed by the Village Engineer, the Contractor may use magnesium free calcium chloride as an admixture in the concrete. The maximum quantity to be used shall not exceed 1% of the cement content of the mix.

5.2.9 CURB AND GUTTER

5.2.9.1 MATERIALS

5.2.9.1.1 All concrete curb construction shall conform to WisDOT Standard Specification, Section 601.

5.2.9.1.2 Concrete for curbs shall be air entrained, Grade A, conforming to WisDOT Standard Specification Section 501, and in particular, meet the following requirements:

5.2.9.1.2.1 Minimum concrete content: 6.0 sacks per cubic yard;

5.2.9.1.2.2 Compressive strength after 28 days cured: 4,000 psi;

5.2.9.1.2.3 Size of course aggregates required: No. 1;

5.2.9.1.2.4 Slump: 1" - 3"; and

5.2.9.1.2.5 Air content: 4.5% - 7.5%.

5.2.9.1.3 Concrete that is rejected on the work site for any reason shall not be re-tempered and used in the work without specific approval of the Village Engineer.

5.2.9.1.4 Concrete Curb and Gutter shall be a standard 6" vertical face curb and gutter type that is 30" wide (6" top curb and 24" flange), 9½" deep at the flange and 14" deep at the back of curb.

5.2.9.1.5 Concrete Curb joints to be spaced at 10 ft. intervals.

5.2.9.1.6 A V-Bottom mountable curb and gutter type that is 30" wide, 9" deep at the flange and 12" deep at the back of curb may be allowed at the discretion of the Village Engineer, on local streets only.

5.2.9.1.7 Where connection is made to existing road, dowels (longitudinally) are required. Dowels conforming to WisDOT Standard Specification Section 505.2.6, shall be installed per WisDOT Standard Specification Section 416.3.6.

5.2.9.1.8 Where connection is made to existing curb and gutter, ties (transversely) are required. Ties conforming to WisDOT Standard Specification Section 505.2.6, shall be installed per WisDOT Standard Specification Section 416.3.6.

5.2.9.2 DESIGN STANDARDS

5.2.9.2.1 Minimum curb grade: 0.7 % (along the gutter flow line).

5.2.9.3 INSTALLATION

5.2.9.3.1 Before the concrete is placed, the crushed aggregate base course under the curb and gutter shall be checked for correct elevation.

5.2.9.3.2 The concrete shall be placed in as nearly a continuous operation as possible.

5.2.9.3.3 Three test cylinders per 1,000 lineal feet shall be taken during the course of the curb and gutter operations. A testing firm, hired by the Developer, shall pick up the cylinders at the project site within 24 hours of paving, break the cylinders at the appropriate time (7, 14, and 28 days) and submit a test report to the Developer. The Developer shall submit a copy of the report to the Village Engineer or designee.

5.2.9.3.4 Prior to applying curing material on the concrete, the face of the curb shall be "branded" with a "W" designating the location(s) of water services, "S" designating the location(s) of sanitary laterals and "SS" for storm sewer laterals. Physical placement of the branding shall be reasonably accurate in a vertical plane above the respective lateral.

5.2.9.3.5 Prior to applying curing material on the concrete, the face of the curb shall be stamped with the contractor's name and year of installation. A stamp is required for each non-contiguous section of curb and gutter.

5.2.9.3.6 The concrete surface shall be sealed, once concrete has set up enough to prevent marring or dilution of surface, by spraying a uniform coating of white curing material meeting the requirements of WisDOT Standard Specification Section 415.2.4, in such a manner as to provide a continuous water-impermeable film on the entire concrete surface which includes the back of the curb and gutter.

5.2.9.3.7 Transverse contraction joints for curbs shall be cut or sawed 1/3 the depth of pavement at a maximum 10-foot intervals. One-inch expansion joints shall be provided at ends of radii, points of considerable change in grade and alignment, at intervals not to exceed 300 feet and where abutting existing curb and gutter.

5.2.9.3.8 Concrete curb and gutter shall cure a minimum of days, based on cylinder breaks, prior to backfilling and crushed stone base installation.

5.2.9.3.9 10 days after the curbs have been placed, or as determined by the 7-day cylinder breaks, and the Village has approved the concrete work, the Contractor shall immediately backfill behind the curbs to preclude any erosion or undermining.

5.2.10 ROAD UNDERDRAIN PIPE

5.2.10.1 MATERIALS

5.2.10.1.1 A continuous 4" diameter perforated, corrugated polyethylene drainpipe, meeting the requirements of AASHTO Designation: M-252, shall be installed under the curb and gutters and extend 25 feet in either direction from storm water catch basins located at low points. For catch basins in other locations, the 25-ft. drainpipe shall be connected only to the upstream side.

5.2.10.1.2 Pipe perforations may be holes or slots and may be in 3 or 4 lines spaced around the circumference of the pipe at 120° or 90° respectively. The end of the drainage pipe opposite the catch basin shall be capped with a cap suitable for installing on the drainage pipe of midstream structures.

5.2.10.1.3 Enough geotextile fabric shall be provided as to cover the sides and bottom of the trench and overlap across the top of the trench by a minimum of 4 inches or the pipe in a sock may be used, see Detail Figure No. 7.

5.2.10.1.4 The trench shall be backfilled with open graded ¾" clear stone.

5.2.10.2 INSTALLATION

5.2.10.2.1 The 4" drainage pipe shall be laid in an 8" deep by 8" wide trench with flat bottom with square sides. The trench, constructed at an elevation lower than the base course, shall be aligned with the proposed centerline of the flange of the curb and gutter. Any damaged drainpipe shall be replaced before the open graded stone is backfilled in the trench.

5.2.11 DRIVEWAYS

5.2.11.1 DESIGN STANDARDS

5.2.11.1.1 Driveway approaches are to be constructed by removing existing curb and gutter and installing poured in-place concrete. This activity requires a Driveway Approach Permit issued by the Village.

5.2.11.1.2 Driveway slopes shall not exceed 10%.

5.2.11.1.3 Driveway slopes shall not exceed 5% in all areas within 25 feet of a building.

5.2.11.1.4 For commercial, industrial and multi-family buildings, if the initial 25 feet of driveway is deemed to be an accessible passenger loading zone, the American Disabilities Act (ADA) requires accessibility routes with longitudinal slopes of not greater than 5% and cross slopes of 2% to be connected to the loading zone and the accessible building entrance.

5.2.11.1.5 AASHTO Sight Distance requirements shall be required at all driveway locations.

5.2.11.1.6 Sidewalks located behind driveway approaches should be the same thickness as the driveway.

5.2.11.2 RESIDENTIAL DRIVEWAYS

5.2.11.2.1 Only one driveway is allowed per parcel for residential developments.

5.2.11.2.2 For multi-family developments, the Plan Commission may grant one or more additional access points, based on the size of the development.

5.2.11.2.3 All residential driveways along roadways with vertical face curb and gutter and side path shall be constructed with a driveway apron.

5.2.11.2.4 Residential width at curb or shoulder = 25' max

5.2.11.3 COMMERCIAL DRIVEWAYS

5.2.11.3.1 The number of commercial driveways shall be the minimum necessary to provide reasonable access for regular traffic and emergency vehicles, while preserving operations and safety along the public roadway. Unless a Traffic Impact Analysis (TIA) shows that a single driveway cannot provide this, only one driveway access will be permitted unless one or more of the following conditions are met.

5.2.11.3.2 The continuous frontage of the parcel is over 300 feet long, in which case an additional driveway per each 300 feet or frontage may be granted by the Plan Commission. Commercial or Retail width at curb or shoulder = 45' max

5.2.11.3.3 Two one-way driveways may be permitted along frontage of at least 150 feet provided the driveways do not interfere with operations at other driveways or along the street.

5.2.11.3.4 The Plan Commission may determine additional driveways are justified due to the amount of traffic generated by the use without compromising traffic operations along the public street.

5.2.11.3.5 All commercial driveways along roadways with vertical face curb and gutter shall be constructed with a minimum of a driveway apron. Certain locations with heavy amounts of traffic will need to use a street type entrance as directed by the Village Engineer.

5.2.11.4 INSTALLATION

5.2.11.4.1 The concrete surface shall be sealed, after the concrete has set up substantially to avoid marring or damage to the concrete, with a uniform coating of curing material meeting the requirements of WisDOT Standard Specification Section 415.2.4, in such a manner as to provide a continuous water-impermeable film on the entire concrete surface. Back of flatwork must be sprayed as well.

5.2.11.4.2 Concrete driveway approaches shall be a minimum of 7" thick. Sidewalks behind driveway approaches shall be the same thickness as the driveway.

5.2.11.4.3 Asphalt driveway approaches shall be a minimum of 3" thick.

5.2.11.4.4 The modification of the curb and gutter and the construction of the driveway approach shall be done in accordance with the driveway approach permit and the construction detail.

5.2.11.4.5 Concrete curb and gutter shall not be saw cut horizontally at driveways. Reconstruction of the curb and gutter is required with pavement ties and felt.

5.2.11.4.6 Expansion joint material, ½" thick for full depth of concrete, shall be placed between the curb and gutter and the approach. Ties shall be required at the joints between existing curb and new curb.

5.2.12 PARKING LOTS

5.2.12.1 Parking lots shall be designed and constructed according to the standards in the Village of Germantown Code Section 17.45

5.2.12.2 Off street parking lots shall be designed to accommodate traffic volumes and pedestrian circulation based on the land use served. And should be situated as close to accessible building entrances as possible.

5.2.12.3 The internal circulation pattern shall be designed with 24-ft. wide driving aisles (measured from edge of pavement marking to edge of pavement marking) for two-way traffic to allow users to maneuver in an efficient & safe manner.

5.2.12.4 The use of landscaped islands & medians shall be used to provide positive guidance to motorist and establish proper driving patterns.

5.2.12.5 Sidewalks adjacent to parking stalls shall be 8 feet wide. Smaller sidewalks may be allowed with prior Village approval. Appeals may be made to the Plan Commission.

5.2.12.6 Turning radii for a single unit truck (SU Design Vehicle) shall be provided as a minimum to all portions of the lot.

5.2.12.7 Slope shall be 2% max in all directions

5.2.12.8 The van-to-regular accessible space ration should equal 1:6.

5.2.12.8.1 Stall dimensions should be as follows:

5.2.12.8.2 Stall Lengths = 20 foot min.

5.2.12.8.3 Stall Widths:

5.2.12.8.3.1 Car = 9 foot min.

5.2.12.8.3.2 Van = 11 foot min; or 8 foot min with 8 foot aisle.

5.2.12.9 Signage and pavement marking required for each stall.

5.2.12.10 Pavement:

5.2.12.10.1 General parking areas are recommended to have at least a minimum of 8-inches of crushed aggregate base course and 2-inches of 3 LT 58-28S Asphaltic Concrete and 2 inches of 4 LT 58-28S Asphaltic Concrete.

5.2.12.10.2 Areas of heavy traffic, such as loading docks, shall have at least a minimum of 10-inches of crushed aggregate base course and 4-inches of 3 LT 58-28S Asphaltic Concrete and 4 inches of 4 LT 58-28S Asphaltic Concrete. Inverted parking lots are discouraged.

5.2.13 SIDEWALK AND PATHWAYS

5.2.13.1 MATERIALS

5.2.13.1.1 Concrete for sidewalks shall be Grade A, conforming to WisDOT Standard Specifications, Section 501, meeting the following requirements:

5.2.13.1.1.1 Minimum concrete content, 6.0 sacks per cubic yard;

5.2.13.1.1.2 Compressive strength after 28 days cured: 3,500 psi;

5.2.13.1.1.3 Maximum amount of water per bag of cement: 6.0 gallons;

5.2.13.1.1.4 Size of course aggregates required: No. 1 plus No. 2;

5.2.13.1.1.5 Slump: 1"-3"; and

5.2.13.1.1.6 Air content: 4.5% - 7.5%.

5.2.13.1.2 Sidewalks are to be constructed of 5-inches of concrete over a 4-inch crushed aggregate base course.

5.2.13.1.3 Driveway crossings shall be 7-inches of concrete over a 6-inch crushed aggregate base course.

5.2.13.1.4 Pathways shall be constructed of a 4 LT 58-28S mix asphalt 3-inches thick over a 5-inch crushed aggregate base course or as directed by the Village Engineer.

5.2.13.2 DESIGN STANDARDS

5.2.13.2.1 Current and future planned side path and trail locations are identified in the Village's Comprehensive Plan. Any development that occurs on or adjacent to these locations is required to connect to, or construct its portion of the system, if not

currently in place, or provide detailed rationale and request a waiver from the Plan Commission and/or Common Council

5.2.13.2.2 Sidewalks and pathways shall be separated from the street by a minimum 6-foot wide grassy terrace with shade trees.

5.2.13.2.3 The outside edge of Sidewalks and pathways shall be located 1-foot from the right-of-way line or as directed by the Village Engineer except at intersection crossings. At intersection crossing, the proper placement shall be determined by the location of the crosswalk and as directed by the Village Engineer.

5.2.13.2.4 Widths of Sidewalks

Local Roads	5 Feet
Collectors and Arterials	6 Feet

5.2.13.2.5 Pathways shall be a minimum of 10 feet wide with 2 feet of gravel shoulder on both sides and in conformance with AASHTO's Guide for the Development of Bicycle Facilities.

5.2.13.2.6 Traverse grade of 2% (1/4" per foot) draining toward the road.

5.2.13.2.7 The maximum allowed longitudinal grade shall be 5%. This grade shall not be exceeded unless the road grade is of a steeper grade, in which case the longitudinal sidewalk grade shall not exceed the road grade.

5.2.13.3 INSTALLATION

5.2.13.3.1 Sidewalk shall be placed by formed methods.

5.2.13.3.2 Contraction joints shall be not less than ¼" wide and ½" deep. Contraction joint spacing shall be 5' or as directed.

5.2.13.3.3 Expansion joints shall be located at a minimum 100 ft O.C. Finished joints shall have ¼" radius. After floating, troweling, and jointing, the concrete shall be brushed with a damp bristle brush.

5.2.13.3.4 Prior to applying curing material on the concrete, the face of the sidewalk or pathway shall be stamped with the contractor's name and year of installation. A stamp is required for each non-contiguous section of sidewalk or pathway.

5.2.13.3.5 The concrete surface shall be sealed, directly after finishing operations, with a uniform coating of white curing material meeting the requirements of WisDOT Standard Specification Section 415.2.4, in such a manner as to provide a continuous water-impermeable film on the entire concrete surface.

5.3 INSPECTION

Contractor shall be responsible for the horizontal and vertical control.

5.3.1 ACCEPTANCE TESTING

5.3.1.1 Tests

5.3.1.1.1 The subgrade shall be inspected before the crushed stone base may be applied. This inspection is done by the Village Inspector or its contracted inspection services. An average tolerance of +/- 0.04-ft. from the approved subgrade elevation shall be allowed.

5.3.1.1.2 The base course shall be inspected and approved by the Village Inspector before the first layer of asphalt can be placed. An average tolerance of +/- 0.04-ft. from the approved base course thickness shall be allowed. Improvements to the base course may be required if, in the opinion of the Village Engineer, conditions for paving do not meet the standard of the Village Engineer.

5.3.1.1.3 A Village Inspector shall be present for the placement of all-concrete curb and gutter. This includes the inspection of the base under the curb and gutter, and a check of the alignment and grade of the curb and gutter.

5.3.1.1.4 Three test cylinders per 1,000 lineal feet shall be taken during the course of the curb and gutter operations. A testing firm, hired by the Developer, shall pick up the cylinders at the project site within 24 hours of paving, break the cylinders at the appropriate time (7, 14, and 28 days) and submit a test report to the Developer. The Developer shall submit a copy of the report to the Village Engineer or designee.

5.3.1.1.5 Curb and gutter elevations will be considered acceptable if certified elevations (by the Village Inspector) are within ¼" of design elevations.

5.3.1.1.6 If evidence indicates that there is standing water in the gutter flange, that portion of the curb and gutter shall be reconstructed to establish positive drainage.

5.3.1.1.7 A Village inspector shall be present whenever any asphalt pavement is being constructed.

5.3.1.1.8 Asphalt to be placed on a roadway, shall arrive at the job site at a temperature of 275° F +/- 25° F. The asphalt inspector will periodically test the temperature of the arriving trucks for the temperature of the asphalt. Any trucks not falling within the guidelines for asphalt temperatures shall be rejected. Paving shall not be done at temperatures below 40 degrees F.

5.3.1.1.9 Both the binder course and the surface course shall be compacted to not less than 91.5% maximum density. Contractor shall have testing done by an independent Lab unless otherwise approved.

5.3.1.1.10 An average tolerance of +/- 0.04-ft. for the binder thickness and +/- 0.04-ft. from the approved final pavement surface elevation shall be allowed.

5.4 STREET LIGHTING

This section covers lighting for Municipally owned streets, sidewalks, parking lots, and parks. The Municipal Lighting is comprised of Municipally owned and maintained lighting and street lighting owned and maintained by We-energies.

5.4.1 WE-ENERGIES OWNED & MAINTAINED STREET LIGHTING

5.4.1.1 This lighting system is owned and maintained by We-energies. We-energies performs the installation and maintenance on all the light poles owned by We-energies.

5.4.1.2 The LED lighting fixture and pole approved by the Village of Germantown is:

5.4.1.2.1 Pole - #20L-LEG-FG Smooth-25'-Bronze

5.4.1.2.2 LED Fixture – LED-3K-Rectangular-Low-Bronze-Class “D”

5.4.2 VILLAGE OWNED PUBLIC STREET LIGHTS

5.4.2.1 The light fixtures & poles owned and maintained by the Village of Germantown fall into several categories of application. Areas of use are for street lighting, lighting along walkways, parking lot lighting (does not include private) and Parks. The type and specific light fixtures and poles to be approved by the Village Engineer/Highway Superintendent.

5.4.2.2 Street Light Approved Materials:

5.4.2.2.1 Control Cabinet; Eagle Traffic Control Systems Model Size – M or sized to match project.

5.4.2.2.2 Concrete Pole by “Traditional Concrete, Inc Model #D715-SP-EA-3x4TO (use with Harp Lights)

5.4.2.2.3 Aluminum Pole by “hapco”. Drawing # B82525-001

5.4.2.2.4 Steel Round Light Pole by LSI; # 5RP-B5-S07G-28-S-BRZ-DGPGA

5.4.2.2.5 Harp Series Light Fixtures by “Holophane; 55w-4K-AS-3-B-5-A

5.4.2.2.6 Milwaukee Harp Light

5.4.2.2.7 ts by TAPCO; Model MH100 w/LED 203-100525121421

5.4.2.2.8 Roadway Luminaire by Eaton; # OVH-E20-LED-E-U-T3-AP-U-K ARM A25410 or A69771

5.4.2.2.9 Area Luminaire by Eaton; # RDG-E02-LED-E-U-T3-BZ-U-7050 ARM A25410 or A69771

5.4.2.2.10 Mirada Medium LED Area Light by LSI; # MRMLLED12LSIL3UNVDIM4070CRI-BRZ

5.4.2.2.11 Pole Mounting Bracket by LSI; BKSPQMHCLR

5.4.2.2.12 LED Bollard Light by Traditional Concrete, Inc; # D303-SP-EA-10 w/CAV6-LED Light Fixture

5.4.2.2.13 Casting Lid for CMP Junction Box by Neenah Foundry # R-5900-E (Electric Lid)

5.4.2.2.14 Enclosure Box-Polymer Concrete by Quazite; (12”x12”) #PC1212BA12; LID #PC1212CA0017 (w/electric logo)

5.4.2.2.15 Enclosure Box-Polymer Concrete by Quazite; (13"x24") #PG1324BA12; LID

5.4.2.2.16 #PG1324HA00017A (w/ electric logo)

5.4.2.3 Street Lighting Cabinet

5.4.2.3.1 Cabinet may vary in size depending on project but shall be bare stainless steel and surface mounted to concrete base.

5.4.2.3.2 Concrete base shall follow Wisconsin DOT standards. Base type to match cabinet size.

5.4.2.3.3 Cabinet should be sized for expansion of system if necessary.

5.4.2.3.4 Photo control shall be in the lighting cabinet and run all lighting.

5.4.2.3.5 Cabinet shall include "Hand Off Auto" switch for testing.

5.4.2.3.6 Cabinet shall have 1 duplex outlet.

5.4.2.3.7 Cabinet shall include 1 light switched to door open/closed.

5.4.2.3.8 Cabinet shall have at least 1 pull box in proximity (within 5') for splitting wiring/circuits.

5.4.2.3.9 Cabinet shall have a minimum of 4 unused 2" conduits between concrete base and pull box for future expansion.

5.4.3 INSTALLATION

5.4.3.1 See the typical drawing in section 8.2.16 (Details) for the typical installation of the public owned streetlights. All other installations shall be approved by the Village Engineer.

5.4.4 INSPECTION/APPROVAL

5.4.4.1 An electrical permit must be obtained from the Village Building Inspection Department for the new electrical service installation and the installation of all lighting wire. Approval will include sign off by electrical inspector and Village Engineer/Highways Superintendent.

6 Project Close-Out

6.1 CONSTRUCTION INSPECTOR BINDER

6.1.1 General

6.1.1.1 Village Inspector shall provide the Village with a Construction Inspection Binder including the following documents.

6.1.1.2 Material Submittals

6.1.1.3 Inspection Reports

6.1.1.4 Test Results/Reports

6.1.1.5 Change Orders / Substitutions

6.1.1.6 Punch list

6.1.1.7 Pay Applications

6.1.1.8 Final Record Set of Construction Plans

6.1.1.9 Warranty waivers (if any)

6.2 LIEN WAIVERS

6.2.1 General

6.2.1.1 Developer shall provide the Village with all lien waivers pertaining to the Public Infrastructure prior to final acceptance by the Village.

6.3 RECORD DRAWINGS

6.3.1 GENERAL

6.3.1.1 Plans shall be prepared by the Contractor on sheets measuring 12" high by 36" wide 24 inches by 36 inches and show Plan and Profile for all sections of underground utilities. Sheets shall have minimum margins of ½ inch on all sides.

6.3.1.2 The title block shall be in the lower right corner of the as built and include at a minimum, the following information:

6.3.1.2.1 Village of Germantown or Consultants Logo

6.3.1.2.2 Location of Utility: Street or Easement

6.3.1.2.3 Record Drawing File Number (Provided by Village Engineer)

6.3.1.2.4 Inspected By

6.3.1.2.5 Date of Plan Approval

6.3.1.2.6 Name of Contractor

6.3.1.2.7 Date of Construction

6.3.1.2.8 Scale (text and line)

6.3.1.2.9 A table of quantities for all utilities shown on each sheet.

6.3.1.2.10 Signature Line for Village Engineer.

6.3.1.3 North shall be to the top or right of the sheet and shall be shown by a 2" long north arrow, clearly, shown without intrusion.

6.3.1.4 The scale of the record drawings shall be same as construction drawings, 1"=50' or 1"=40'. This shall be shown with a graphic scale and text.

6.3.1.5 The seal and signature of the professional engineer responsible for the preparation of the record drawing shall be shown immediately adjacent to the title block.

6.3.1.6 All existing lot, property, and utility easement lines in the area in which the utility is located shall be shown.

6.3.1.7 Screen any existing features, including but not limited to building corners and parking lots.

6.3.1.8 The address, lot and block numbers, and subdivision or development name shall be indicated. Addresses shall be labeled with italics. Unplatted lands and the address of any home on such lands shall be so indicated.

6.3.1.9 All street names and easements with record numbers shall be clearly shown.

6.3.1.10 Two SEWRPC reference benchmarks shall be shown on each sheet.

6.3.1.11 Plan sheets shall start and terminate at match lines and show adjacent As-Built record drawing file numbers.

6.3.1.12 Pipe invert elevations shall be clearly shown.

6.3.1.13 Screening of existing sanitary sewer, storm sewer and watermain and service locations either in screened or dashed format.

6.3.1.14 Dimensions showing offset from right-of-way and roadway or easement centerline to utility alignment.

6.3.1.15 Concurrent with the hard copy submittal. Provide complete set of records printed on record drawing paper as approved by the Village Engineer.

6.3.1.16 Provide complete set of records in PDF format.

6.3.1.17 Provide complete set of records in AutoCAD (.DWG) format on CD tied to the Wisconsin State Plane NAD 1927/1983 Wisconsin South Grid coordinate system and profiles in NAVD 1988.

6.3.1.18 The cost of archiving the record drawings and insertion of the data into the Village's GIS System shall be the sole responsibility of the DEVELOPER.

6.3.2 SANITARY SYSTEM

6.3.2.1 A general note on each sheet giving the size, class, type, ASTM designation, and manufacturer of every main and lateral shall be shown, with material quantities clearly tabulated. Complete information on manhole frames / lids / barrel structure shall be noted. Manholes shall be ID'd with Systems Plan Number provided by Village Engineer on record drawing.

6.3.2.2 Sanitary mainline should be thickest line on plan.

6.3.2.3 The percent grade, direction of flow, and center to center length of sanitary sewer installed between manholes and laterals shall be shown.

6.3.2.4 All laterals shall have invert elevations at right-of-way lines or easement line and lengths clearly shown.

6.3.2.5 The following information shall be shown for each manhole:

6.3.2.5.1 Invert elevation of each sewer pipe

6.3.2.5.2 Rim Elevation

6.3.2.5.3 Pipe size of each sewer

6.3.2.5.4 Type of frame to chimney seal

6.3.2.6 Indicate External seals or internal chimney seals

6.3.2.7 All record drawings shall reference NVGD 1988

6.3.3 WATER SYSTEM

6.3.3.1 The size, class, type, and manufacturer of every main shall be shown. The location of the main shall be dimensioned from the centerline of the right-of-way. The center to center length of main installed between valves, fittings, and laterals shall be shown.

6.3.3.2 Water mainline shall be the thickest line on plan.

6.3.3.3 The location of all fittings (including valves, tees, crosses, reducers, air vents, bends, and lateral taps) shall be dimensioned from/to centerline of each fitting. All fittings shall be suitably labeled for identification.

6.3.3.4 Curved lines shall indicate deflected pipe (with curve data provided); lines shall be straight between fittings.

6.3.3.5 Show which side of the main the operating nut for butterfly valves is located on.

6.3.3.6 A general note on each sheet giving the brand and manufacturer (model, size, etc.) for each valve used shall be provided, with quantities of each clearly tabulated. Services shall include footage and count. Complete information on valve boxes and manhole frames / lids / barrel structure shall be noted.

6.3.3.7 All laterals shall be shown giving the length and type of material used. The manufacturer and model of tapping saddle or tee, corporation, curb stop, and box shall be given.

6.3.3.8 Contractor to include latitude, longitude and elevation of the location of all:

6.3.3.8.1 Valves, tees, crosses, reducers, air vents, bends and lateral taps.

6.3.3.8.2 The location shall be tied-in by distance to at least two permanent surface points. These can be manholes, hydrants, other valves, or other suitable points. The point used should be clearly referenced.

6.3.3.8.3 Hydrants.

6.3.3.8.4 The size and type of every hydrant shall be also shown.

6.3.3.8.5 The shutoff valve shall be tied-in to at least two permanent surface points.

6.3.3.8.6 All hydrants differing from 6.5' bury shall have the bury depth or length of extensions installed noted.

6.3.3.8.7 Elevation of each hydrant tied to the northwest nut of the top flange should be shown.

6.3.3.8.8 Provide depth of cover.

6.3.4 STORM SYSTEM

6.3.4.1 The size and type of all mains and leads shall be shown. Their location relative to the centerline of the right-of-way shall be dimensioned. The total length of sewer installed shall be shown.

6.3.4.2 The center-to-center distance between laterals and/or manholes shall be shown.

6.3.4.3 GPS coordinates, using State Plane NAD 1927 Wisconsin South coordinate system size, type and manufacturer of all manholes, catch basins, inlets, or outlet sections shall be shown. Material quantities shall be clearly tabulated.

6.3.4.4 Elevations of all rims, flow lines, catch basins, gutter inlets, and outlet sections shall be given. Invert elevations shall be given for gutter inlets, catch basins, and manholes. Elevations shall be based on the Village of Germantown datum.

6.3.5 ELECTRICAL SYSTEM

6.3.5.1 The size and type of all conduit and cable shall be shown. Their location relative to the centerline of the right-of-way shall be dimensioned. The total length of electrical infrastructure installed shall be shown.

6.3.5.2 The center-to-center distance between all electrical structures shall be shown.

6.3.5.3 GPS coordinates, size, type, and manufacturer of all structures shall be shown. Material quantities shall be clearly tabulated.

6.3.5.4 Elevations of all rims, pedestals, and other essential infrastructure shall be based on the Village of Germantown datum.

6.3.6 GRADING CERTIFICATION PLAN

6.3.6.1 In preparing a Certification Plan, the Developer's Design Grading Plan shall be shown as screened background.

6.3.6.2 Record drawing grades shown on lot lines shall be no less than 0.30 ft. lower than final grades shown on approved master grading plan or higher than 0.10 ft. above the final grades shown on approved master grading plan. The Developer is required to establish final grades within 5 feet of side lot lines, rear lot lines and the front right-of-way area between the front-line lot line and the back of curb in an urban setting or edge of shoulder in a rural setting. These areas shall be described as a "no-touch zone". All grades within the "no-touch zones" shall be certified by Developer's Engineer. Developer shall typically show spot grades alongside lot line at front curb, front property corners, front setback, back of house extended, any high points, and rear property corners.

6.3.6.3 The grades alongside lot lines are needed even in wooded, ungraded areas.

6.3.6.4 Existing house pad grade (elevation taken at the center and each corner of a typical 66' x 54' house, except for lots designed for rear exposure house show existing grade at front and back of typical house). House pads are to be left 1.75' below finish yard grade with a +/- 3" tolerance.

6.3.6.5 Elevations every 50 feet along developer graded swales and ditches.

6.3.6.6 Elevations every 100-ft. Station along the road alignment. Locations shall include:

6.3.6.6.1 Pavement centerline and edges

6.3.6.6.2 Edge of shoulder

6.3.6.6.3 Ditch flowline

6.3.6.6.4 Top of embankment on the backslope of the ditches.

6.3.6.7 After analyzing certified grades, Developer shall identify on plan those areas not within above tolerance. Show areas to be regraded, or areas where it may be desirable to revise the proposed grades in the Master Grading Plan.

6.3.7 STORM WATER BMP CERTIFICATION PLAN

6.3.7.1 Elevations (minimum of every 50')

6.3.7.1.1 Top of Berm

6.3.7.1.2 Top of Slope

6.3.7.1.3 Toe of Slope

6.3.7.1.4 Safety Shelf Edges

6.3.7.1.5 Bottom of BMP

6.3.7.2 Spillway-Top of Slope & Toe of Slope (detailing length, width and height)

6.3.7.3 Structure Locations and Elevations

6.3.7.3.1 Outfall (invert elevation and size)

6.3.7.3.2 Overflow structures (corners of opening) and Piping (invert elevation and size)

6.3.7.3.3 Inlet Structures (center of manhole) and Piping (invert elevation and size)

6.3.7.3.4 Outlet Structures (center of manhole) and Piping (invert elevation and size)

6.3.7.3.5 Weirs (invert elevation and size)

6.3.7.3.6 Orifice (invert elevation and size)

6.3.7.3.7 Inlet/Outlet (invert elevation and size)

6.3.8 EASEMENTS

6.3.8.1 GENERAL

6.3.8.1.1 The Developer shall prepare formal written easement documents, including exhibits and written legal description attachments for each easement and record the same with the County Register of Deeds after review and approval by the Village of Germantown for each easement (Utility, drainage, access, etc.) shown on the subdivision plat (or CSM) as a condition of Final Plat (CSM) approval.

6.3.8.1.2 All ponds are to be in platted outlots.

6.3.8.1.3 No encroachment by structures, berms, trees, shrubs, paved surfaces or changes in grade greater than 4" are allowed in easement areas without approval of the Village Engineer.

6.3.8.1.4 20-ft. wide minimum width for a single utility. The utility shall be located in the center of the final easement based on record drawing. Easement width may be increased to 50 feet based on pipe size and depth.

6.3.8.1.5 Easements with multiple utilities, the minimum separation from outside of the utility to the easement line shall not be less than 10 feet subject to approval by the Village Engineer. Add not less than 10 feet per additional utility in the easement.

6.3.8.1.6 Maximum ground slope along easements:

6.3.8.1.6.1 transverse: 25%

6.3.8.1.6.2 longitudinal: 10%.

6.3.9 STORM SYSTEM

6.3.9.1 The Village requires public storm sewer and/or drainage easements for any storm water conveyance system that drains public ROW areas or neighboring off-site areas.

6.3.9.2 A storm sewer running along the rear lot lines within a subdivision, specifically to drain backyards, does not warrant a public easement. The Village considers this to be a private system built for the lot owners of the subdivision and owned/maintained by the property owners.

7 Surveying Standards

7.1 GENERAL

7.1.1 General

7.1.1.1 Surveys shall conform to the provisions of Chapter 236 of the Wisconsin Statutes, A-E7 of the Wisconsin Administration Code and all applicable ordinances of the Village of Germantown.

7.2 HORIZONTAL AND VERTICAL CONTROL

7.2.1 General

7.2.1.1 Horizontal and vertical control shall be maintained throughout the entire project area from the staking of rough grading to final restoration.

7.2.1.2 Horizontal and vertical control points shall be clearly marked and protected (i.e. lath) during construction.

7.2.1.3 Second order precision shall be required for vertical control, and the following formula will be used in determining the second order of precision. $E = 0.035 \div M$; where E = error and M = length of the line in miles.

7.2.1.4 Vertical control points shall be established at least every 800 feet and within 100 feet of any improvement proposed. These control points will be established in accordance with Section 1.1.6, 1.1.7, and 1.1.8 of these Standards.

7.2.1.5 When plans are submitted for approval to the Village Engineer, the Project Engineer will also at this time submit a list of all permanent benchmarks, all temporary benchmarks, a description of their location and the basis or origin of the vertical control network and the error of closure for the entire network. This section shall be complied with before the Village of Germantown will schedule inspections.

7.2.1.6 All benchmarks shall be run in from one of the following; listed in priority order.

7.2.1.6.1 A U. S. Coastal and Geodetic survey monument.

7.2.1.6.2 A National Geodetic Survey monument.

7.2.1.6.3 A U. S. Public land survey monument and its accompanying reference benchmark.

7.2.1.6.4 Permanent benchmarks shall be set only on the following objects:

7.2.1.6.4.1 Concrete door stoops.

7.2.1.6.4.2 Concrete headwalls.

7.2.1.6.4.3 Existing permanent manhole rim (note: manhole shall not be in the general construction area, nor is it to be affected in any way by the project construction).

7.2.1.6.5 Fire hydrants on marked flange bolt.

7.2.1.6.6 Temporary benchmarks may be set in the following objects.

7.2.1.6.6.1 Power poles.

7.2.1.6.6.2 Trees 12 inches in diameter or greater.

7.2.1.6.7 The error in latitude and departure closure for horizontal traverses shall be no greater than the ratio of one in 10,000 (1:10,000).

7.3 CONSTRUCTION STAKING

7.3.1 General

7.3.1.1 Roadways shall be staked for subgrade and for final gravel grade and meet the following conditions:

7.3.1.2 Stakes shall be set along the centerline of the roadway, or approved offset.

7.3.1.3 Stakes shall be set at 50-foot intervals.

7.3.1.4 Stakes shall be set for vertical curves at a maximum of 50-foot intervals.

7.3.1.5 Stakes shall be set for horizontal curves having a degree of curve greater than 30° at a maximum of 50-foot intervals.

7.3.1.6 Stakes shall be set at points of curvature, points of tangency, and all low/high points on vertical curves.

7.3.1.7 Lath shall be set next to all roadway stakes and shall have the station labeled with indelible magic marker. Labeling shall indicate station and offsets, in addition to coordinate points.

7.3.1.8 Staking for curb and gutter will be done on a minimum three (3) foot off back of curb with cut/fill to the top of curb.

7.3.1.9 Staking for sanitary sewer/watermain shall be centerline type or on an offset as requested by the contractor and approved by the Village Engineer.

7.3.1.10 Staking for sanitary sewer/watermain shall be done every fifty (50) feet along the pipe centerline or agreed to interval between the Village and contractor.

7.3.1.11 Manholes shall have stakes at the following locations:

7.3.1.11.1 Centerline of manhole.

7.3.1.11.2 Offset (determined by contractor and approved by the Village Engineer—minimum 10-foot).

7.3.1.11.3 Straddle point.

7.3.1.12 Catch basins, and hydrants shall have an offset stake (minimum offset 5-foot).

7.4 MONUMENTS

7.4.1 General

7.4.1.1 Lot corner monuments (i.e. iron pipe, rebar) shall be pounded flush with existing ground, thus conforming with Wisconsin Statute 236.15 (1).

7.4.1.2 All 1-inch iron pipe or iron rebar to be used to monument a lot corner it shall include a plastic or aluminum survey cap on top which bears the project surveyor's state registration number. Both types of monuments are to conform to the current minimum length and weight requirements

7.4.1.3 A subdivision corner which is also a U.S. Public Land Survey corner shall be monumented using the following type of monument in the specified area:

7.4.1.4 6-inch x 6-inch concrete monument with 4-inch brass cap Monuments will be supplied by the Washington County Surveyor. The County Surveyor shall be notified in writing of any USPLSS corners that will be disturbed by construction 30 days prior to the start of construction. This is a Wisconsin Statutory requirement. Replacement monuments will then be installed by the County Surveyor and/or the Village of Germantown. This will be done at the Developer's expense.

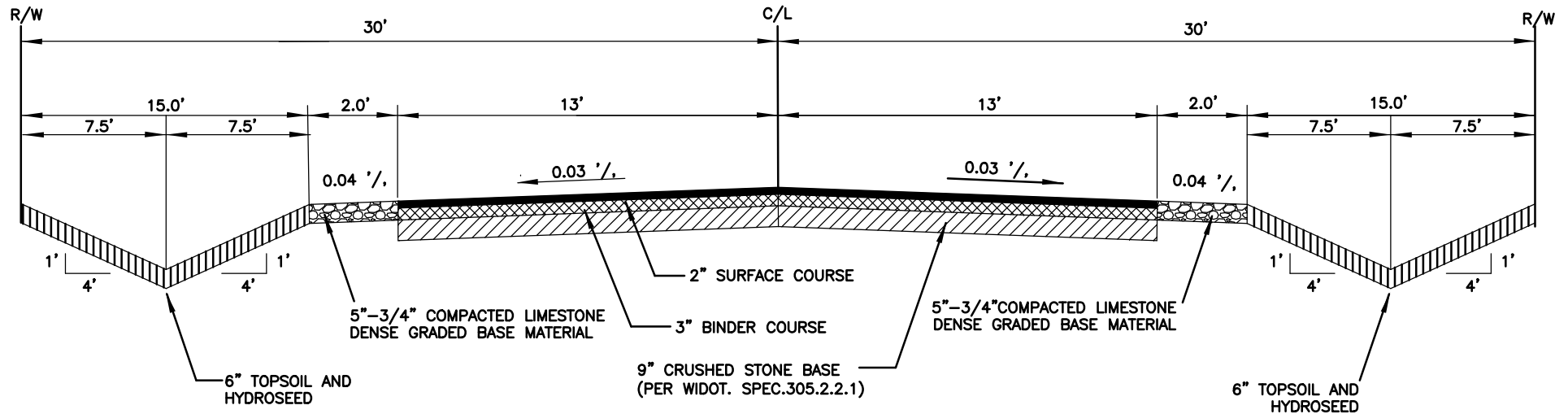
7.5 PLATTING

7.5.1 General

7.5.1.1 Final subdivision plats will be signed by the Village once all construction has been completed and accepted, all punch list items resolved, all record drawings have been submitted and approved and all boundary markers have been set in conformance

LOCAL ROAD DETAIL FOR SUBDIVISIONS - RURAL - CROSS SECTION	1
RESIDENTIAL STREET DETAIL - URBAN - CROSS SECTION	2
INDUSTRIAL ROAD DETAIL - CROSS SECTION	3
RESIDENTIAL CUL-DE-SAC - RURAL - VARYING ISLAND	4
RESIDENTIAL CUL-DE-SAC - URBAN - VARYING ISLAND	5
FLARED DRIVEWAY APPROACH - URBAN - CONCRETE CURB	6
RESIDENTIAL ROAD DETAIL - MOUNTABLE CURB - CROSS SECTION	7
INDUSTRIAL AND COMMERCIAL DRIVE APPROACH	8
TYPE-1 CURB RAMP - CENTER OF CORNER RADIUS	9
TYPE-1-A RAMP - NO TERRACE	10
MOUNTABLE CURB AND GUTTER	11
30" VERTICAL FACE CURB AND GUTTER	12
CONCRETE SIDEWALK	13
MOUNTABLE CURB - REJECT	14
MOUNTABLE CURB SECTION - ROLL FACE	15
SUBDIVISION ENTRANCE - ISLAND	16
END SECTION OF CURB AND GUTTER	17
DRIVEWAY CULVERT - CROSS SECTION	18
CATCH BASIN	19
STORM MANHOLE	20
STORM MANHOLE	21
STORM MANHOLE CHIMNEY ASSEMBLY - PAVEMENT	22
INTERIM PAVEMENT NET INSTALLATION	23
INTERIM PAVEMENT INLET TO FINAL RIM GRADE CONVERSION	24
FIELD INLET	25
TIPPED INLET	26
ADS N12 DITCH ENCLOSURE PIPING - RURAL - CROSS SECTION	27
PVC HYDRANT BRANCH DETAIL - N.T.S.	28
FLUSHING HYDRANT - ECLIPSE 2	29
HYDRANT BOLLARD	30
WATER MAIN METER VAULT	31
1 1/2" - 2" METER INSTALLATION	32
HDPE JOINT RESTRAINT	33
HYMAX FORCE MAIN - LATERAL CONNECTION	34
SANITARY & SAMPLING MANHOLE	35

DRAWING	PAGE NO.
SANITARY MANHOLE - OUTSIDE DROP PRECAST	36
SANITARY MANHOLE CHIMNEY	37
SANITARY MANHOLE CHIMNEY - IN TURF 1	38
SANITARY MANHOLE CHIMNEY - IN TURF 2	39
SANITARY LATERAL	40
SANITARY RECONNECTION	41
BORING OR JACKING CASING PIPE - FLOWABLE FILL	42
BORING OR JACKING CASING PIPE - CASING SPACERS	43
WADDLE INSTALLATION	44
EROSION CONTROL MEASURES - MULTIPLE	45
INLET PROTECTION - TYPE C - CURB BOX	46
INLET PROTECTION - TYPE D	47
PUBLIC OWNED LIGHT - URBAN	48
BACKFILL ZONES FOR USE ON D.O.T. RIGHT OF WAY	49
WATER MAIN AND SANITARY TRENCH	50
TYPE III (3) BARRICADE - PERMANENT INSTALLATION	51
END OF ROAD	52



NOTE:

ALL ROAD SUBGRADE WILL BE PROOF ROLLED USING A FILLED TRI-AXLE TRUCK PRIOR TO THE INSTALLATION OF ANY AGGREGATE BASE COURSE..

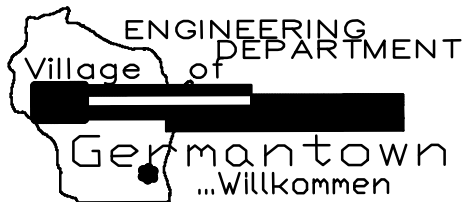
AREAS THAT DO NOT PASS THE PROOF ROLL WILL BE EXCAVATED A MINIMUM OF 2' AND RE-COMPACTED TO THE APPROVAL OF THE VILLAGE ENGINEER.

ASPHALT TYPE TO BE PER CONTRACT SPECIFICATIONS

NOTE:

DEVELOPMENTS WITH PRIVATE ROADS ARE REQUIRED TO CONSTRUCT THE ROADWAY PER THE APPROVED TYPICAL CROSS SECTION SHOWN ABOVE.

REVISED 8/30/2019 RCB

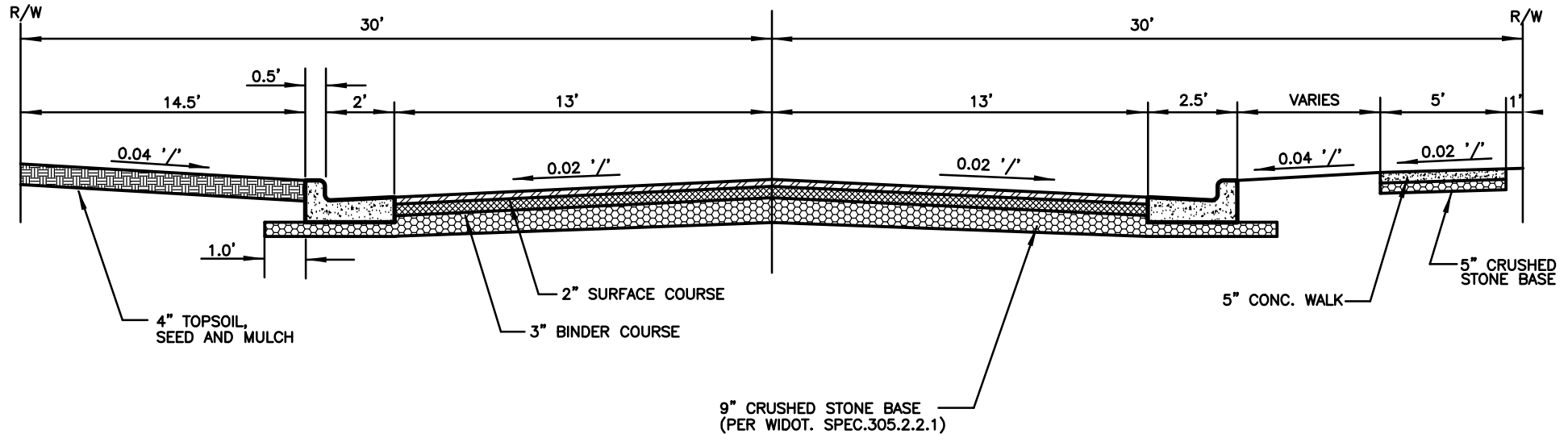


LOCAL ROAD DETAIL FOR SUBDIVISIONS

TYPICAL CROSS SECTION- RURAL

NOT TO SCALE

NOT TO SCALE



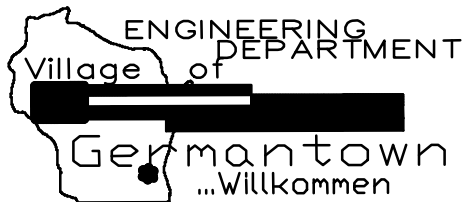
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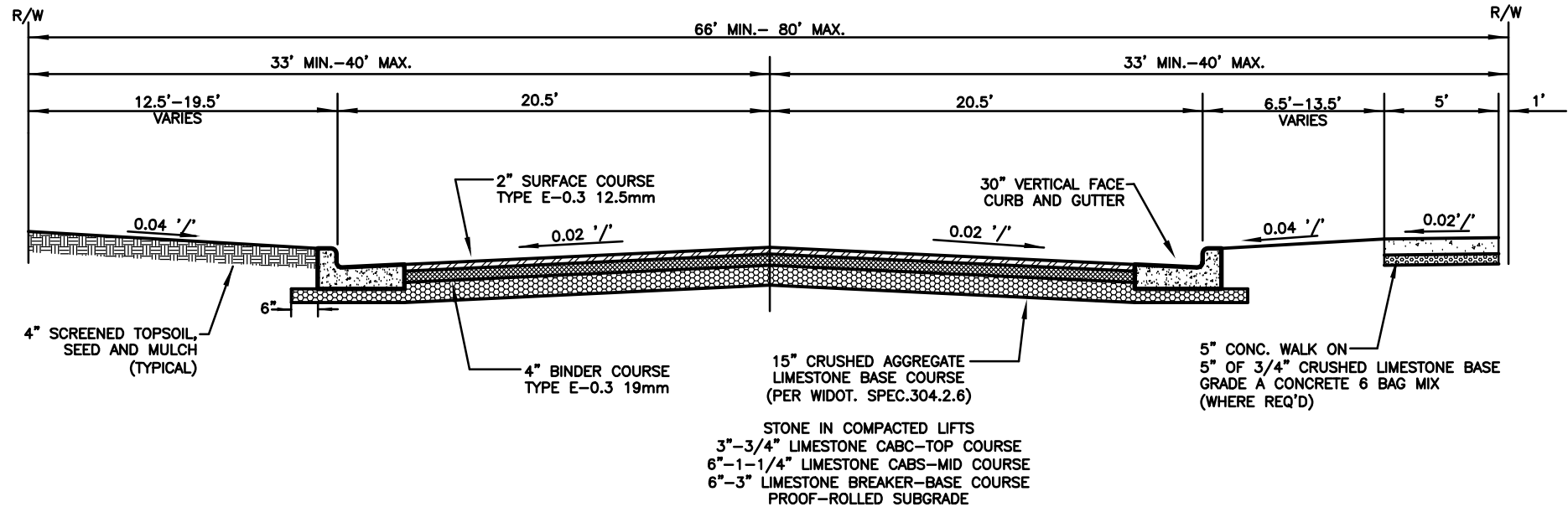
ROADWAY TO BE CENTERED WITHIN RIGHT OF WAY.



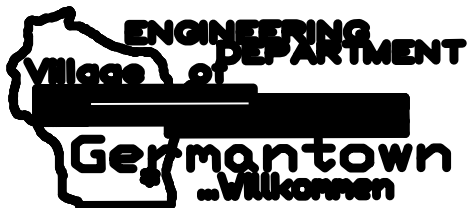
TYPICAL CROSS SECTION URBAN RESIDENTIAL STREET DETAIL

NOT TO SCALE

REVISED August 28, 2019 RCB

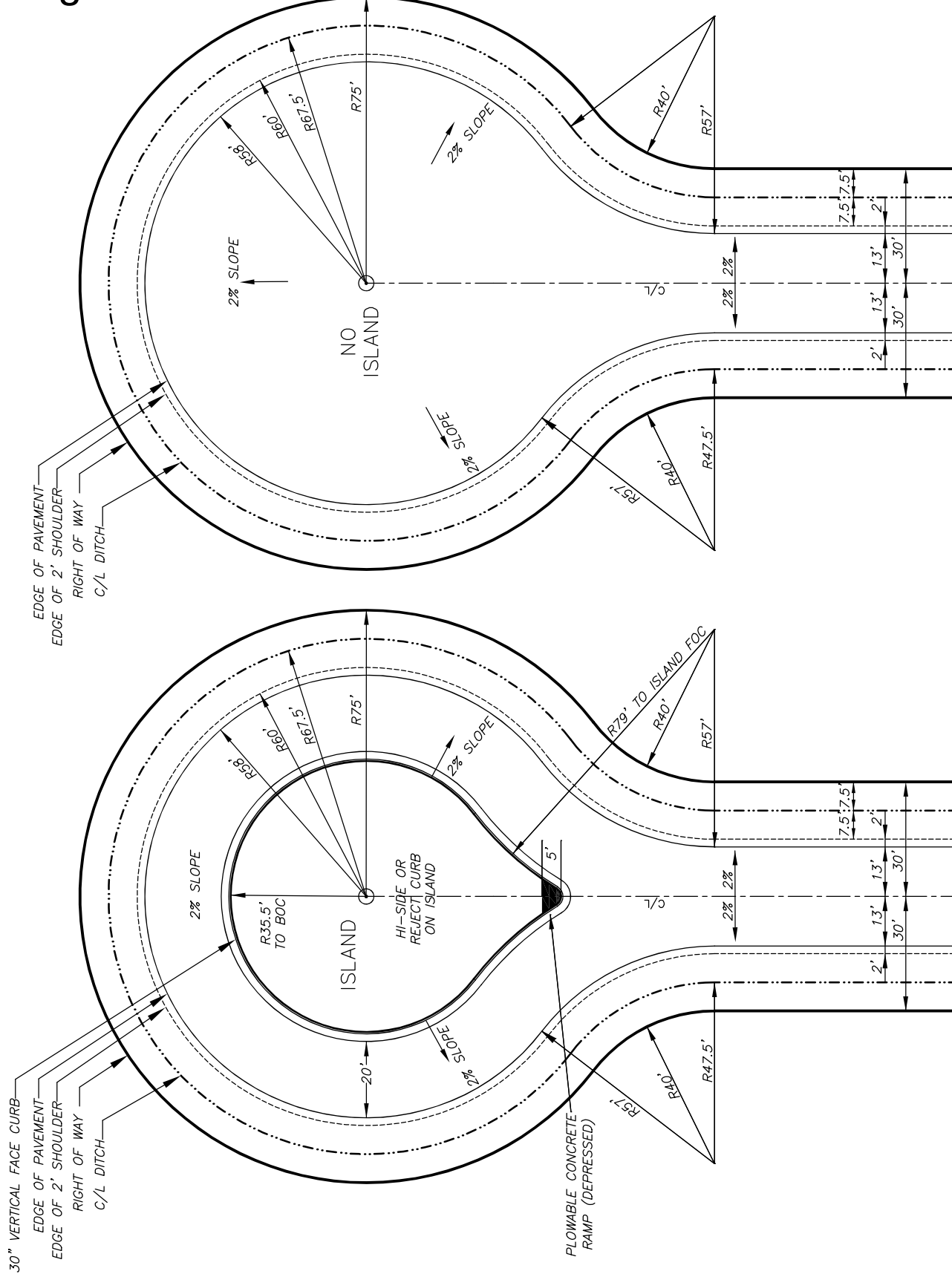


REVISED 8/30/2019 RCB



STANDARD INDUSTRIAL ROAD DETAIL TYPICAL CROSS SECTION

NOT TO SCALE



NOTE: ALL CUL DE SACS HAVE VERTICAL FACE CURB & GUTTER IN ISLAND
MAINTENANCE OF ALL ISLAND AREAS INCLUDING GRASS MOWING IS THE
RESPONSIBILITY OF THE SUBDIVISION HOMEOWNERS ASSOCIATION



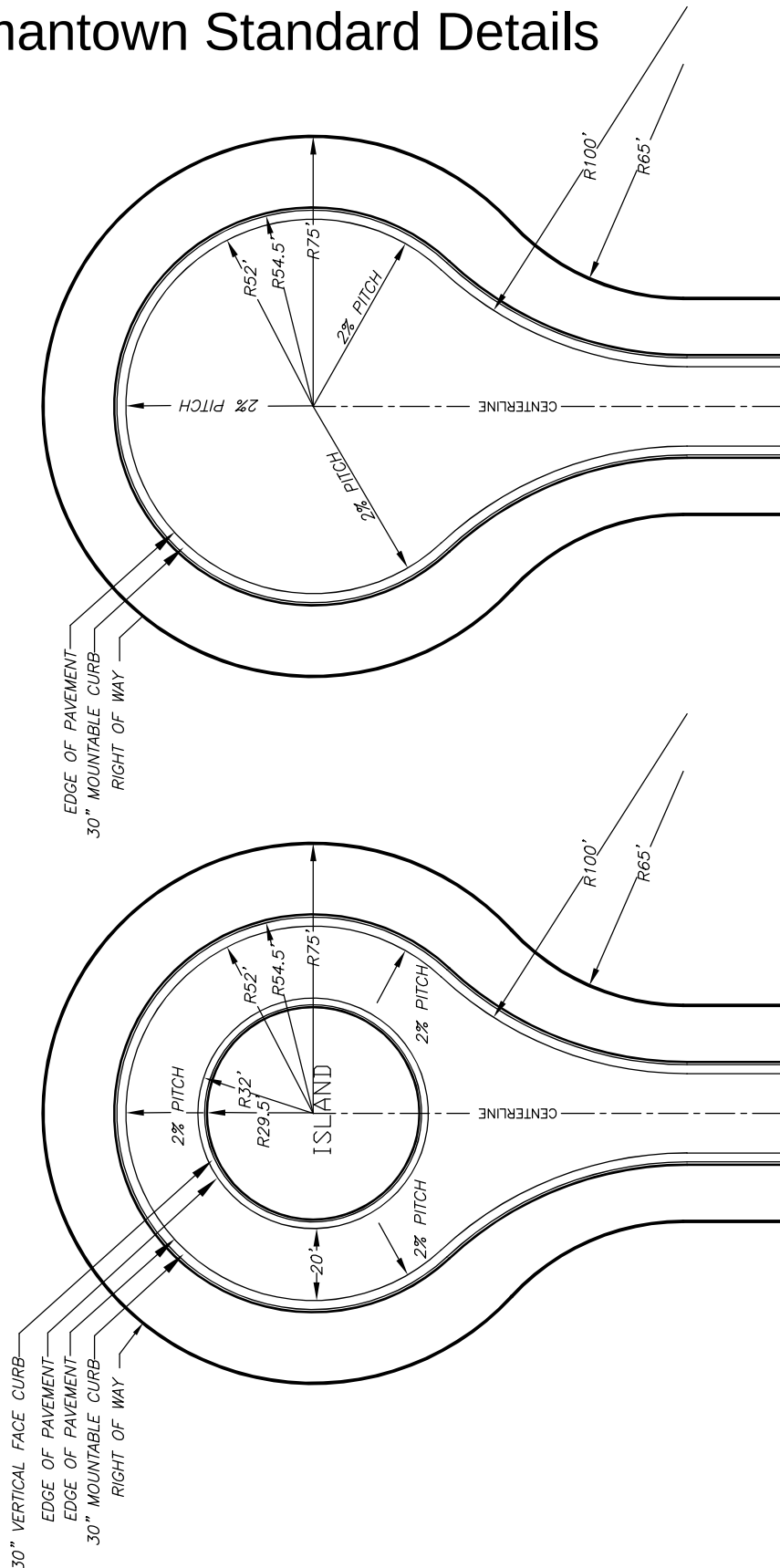
STANDARD RESIDENTIAL CUL-DE-SAC DETAIL -RURAL-

NOT TO SCALE

WITH AND WITHOUT ISLAND

APPROVED 2/2006 REVISED 11/2018 RCB

TYPICAL RESIDENTIAL URBAN STREET CUL DE SAC

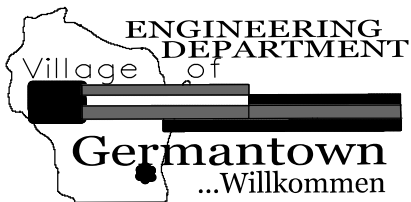
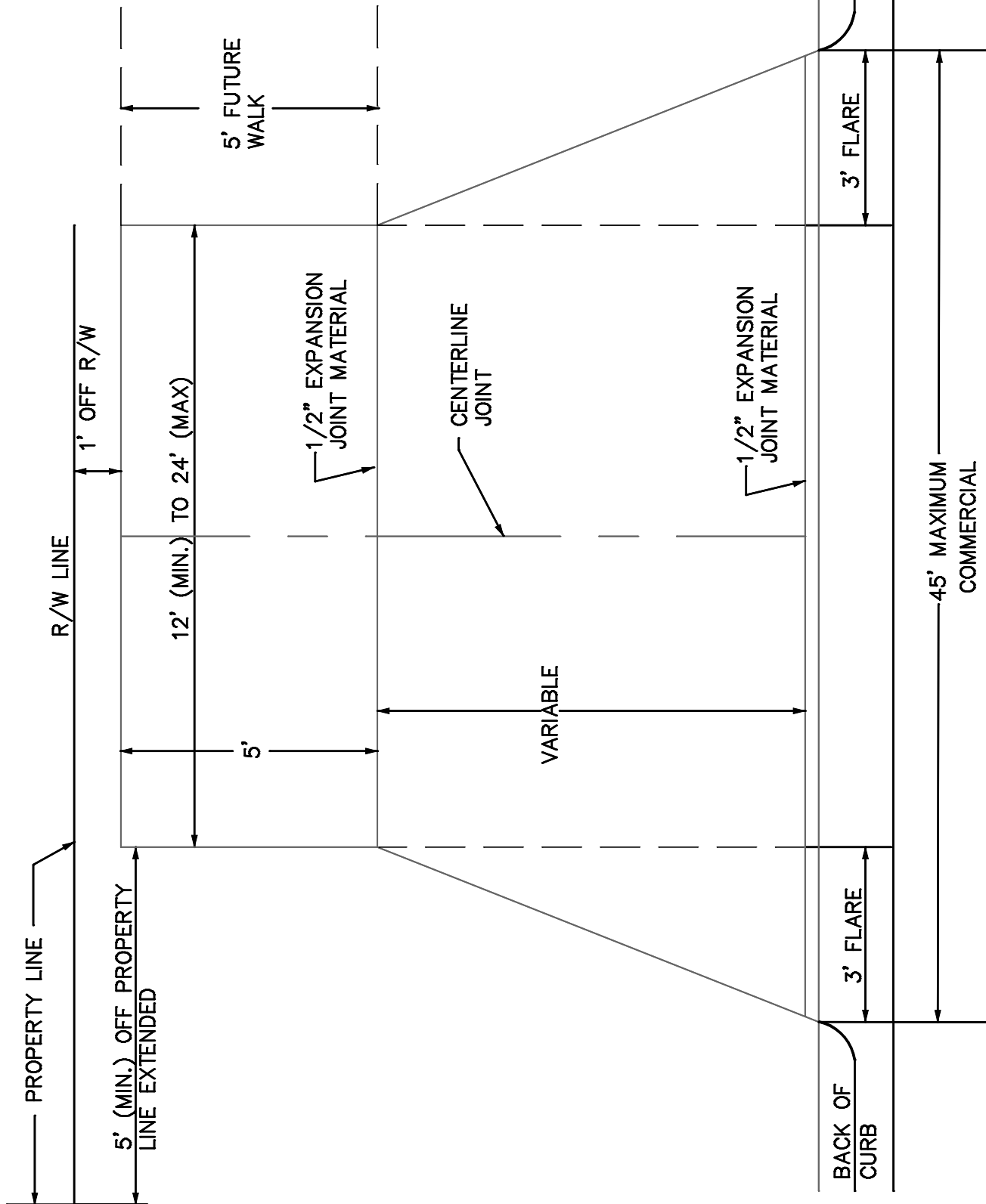


NOTE: ALL CUL DE SACS HAVE VERTICAL FACE CURB & GUTTER IN ISLAND
MAINTENANCE OF ALL ISLAND AREAS INCLUDING GRASS MOWING IS THE
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DATE: 2/3/2020 RCB

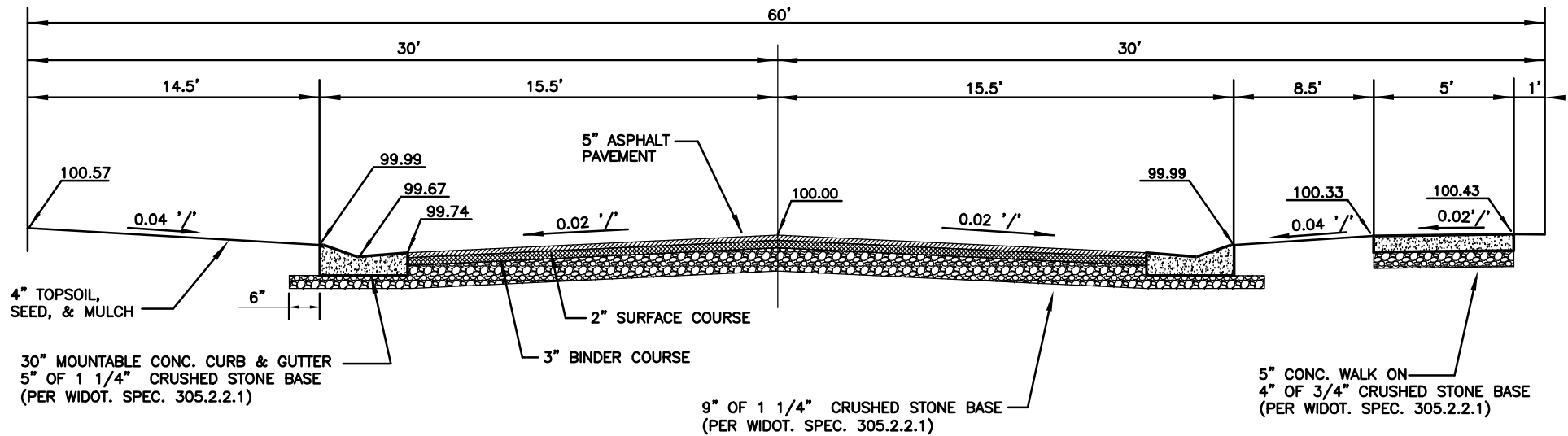


STANDARD DETAIL
URBAN CUL-DE-SAC
WITH AND WITHOUT ISLAND



TYPICAL FLARED DRIVEWAY APPROACH -URBAN SECTION CONCRETE CURB

REVISED 10/9/2018 RCB

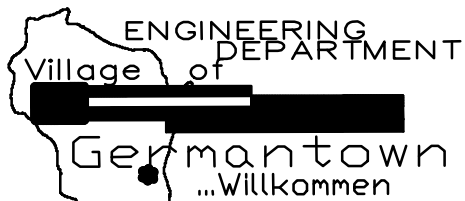


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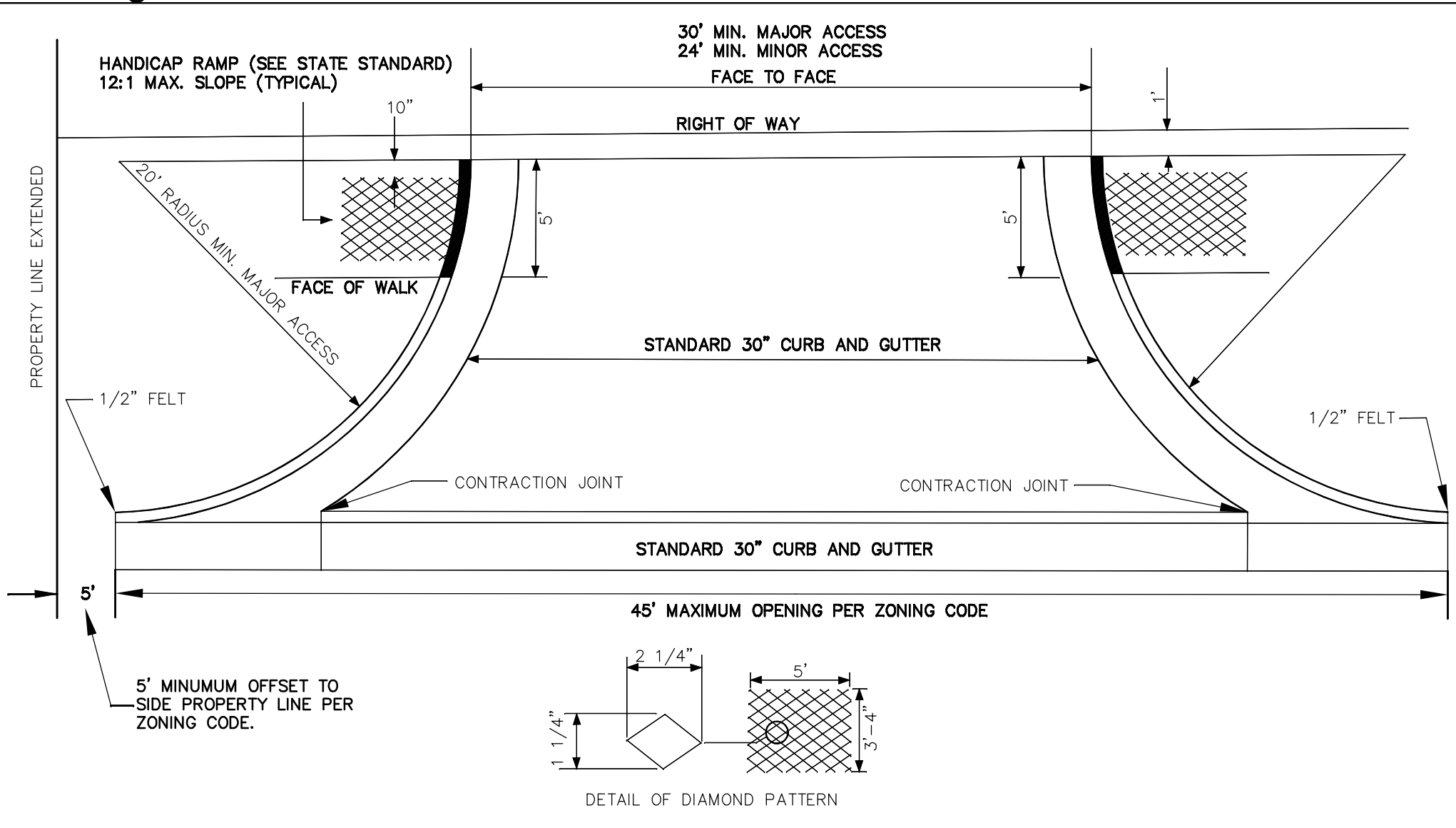
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PER CONTRACT SPECIFICATIONS



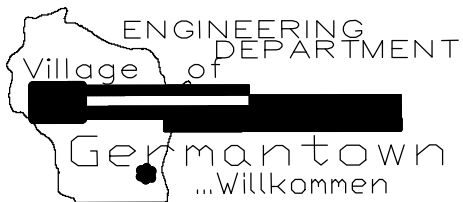
STANDARD RESIDENTIAL ROAD DETAIL TYPICAL CROSS SECTION MOUNTABLE CURB

REVISED 8/30/2019 RCB

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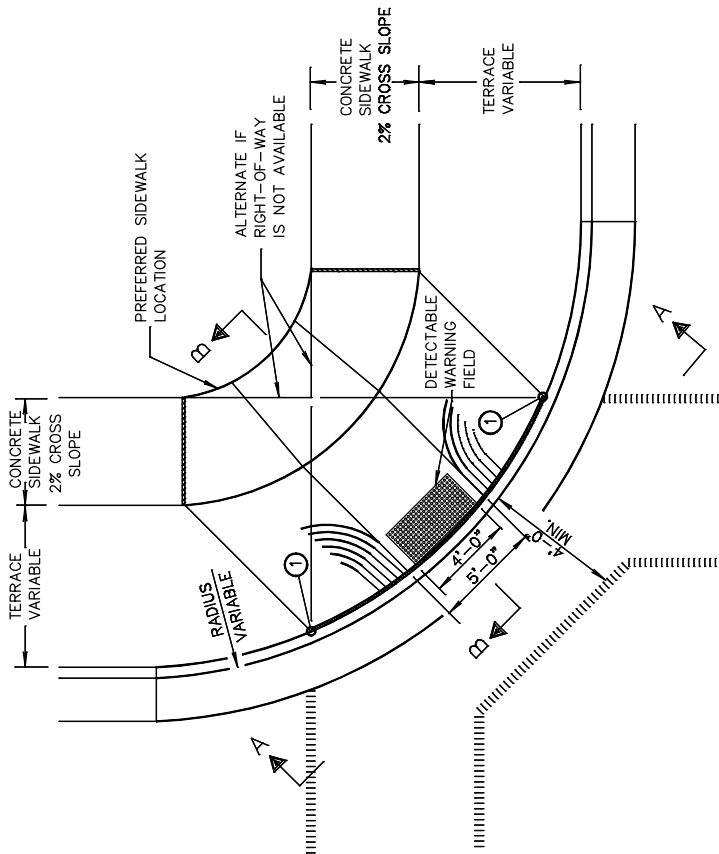


REVISED 8/29/2019 RCB

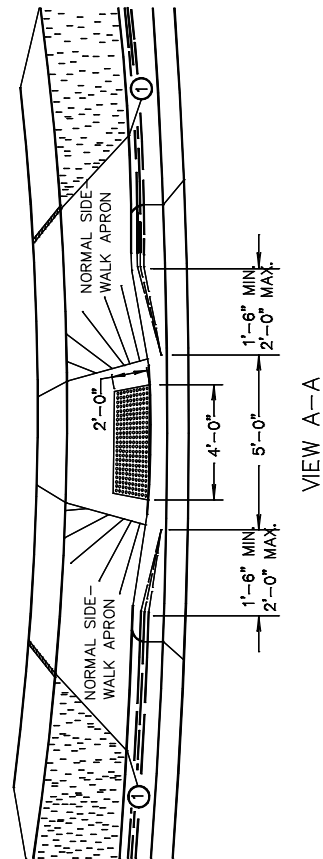


INDUSTRIAL & COMMERCIAL DRIVE APPROACH

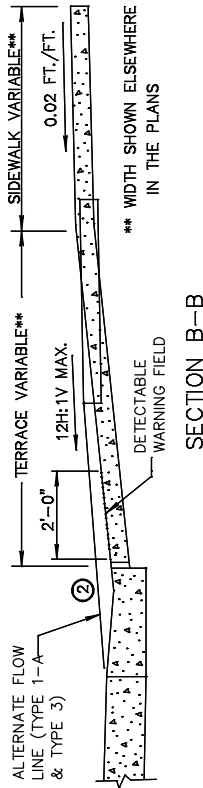
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PLAN VIEW



VIEW A-A



SECTION B-B

GENERAL NOTES

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS.

RAMPS SHALL BE BUILT AT 12H:1V OR FLATTER. WHEN NECESSARY, THE SIDEWALK ELEVATION MAY BE LOWERED TO MEET THE HIGH POINT ON THE RAMP.

TYPE 1 RAMPS SHALL HAVE A NORMAL SIDEWALK APRON AND CURB ON BOTH SIDES OF RAMP. DETECTABLE WARNING FIELD SHALL BE MEASURED AND PAID BY THE SQUARE FOOT AS "CURB RAMPS DETECTABLE WARNING FIELD". THE CONCRETE PEDESTRIAN CURB, IF NEEDED, SHALL BE MEASURED AND PAID BY THE LINEAL FOOT AS "CONCRETE CURB PEDESTRIAN". CONCRETE SIDEWALK IN THE CURB RAMP AREA SHALL BE MEASURED AND PAID BY THE SQUARE FOOT AS CONCRETE SIDEWALK, INCLUDING THE AREA UNDER THE DETECTABLE WARNING FIELD.

SELECT CURB RAMP DETECTABLE WARNING FIELD MATERIALS AND DEVICES FROM THE DEPARTMENT'S APPROVED MATERIALS LIST. THE COLOR OF THE DETECTABLE WARNING FIELD IS SPECIFIED ELSEWHERE AND IS INCIDENTAL TO THE BID ITEM OF "CURB RAMP DETECTABLE WARNING FIELD".

SURFACE TEXTURE OF THE RAMP SHALL BE OBTAINED BY COARSE BROOMING TRANSVERSE TO THE SLOPE OF THE RAMP.

- ① THIS POINT IS AN EXTENSION OF OUTSIDE EDGE OF APPROACHING SIDEWALK WHERE IT MEETS THE BACK OF CONCRETE CURB.
- ② GRADE CHANGE BETWEEN GUTTER FLAG SLOPE AND THE CURB RAMP SLOPE SHALL NOT EXCEED 11%. PROVIDE DRAINAGE AWAY FROM CURB RAMP AT GUTTER FLAG INTERFACE.

LEGEND

- EXPANSION JOINT-SIDEWALK
- CONTRACTION JOINT FIELD LOCATED
- PAVEMENT MARKING CROSSWALK (WHITE)
- ALTERNATIVE LAYOUT

REV. 8/28/2019 RCB

GENERAL NOTES

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS.

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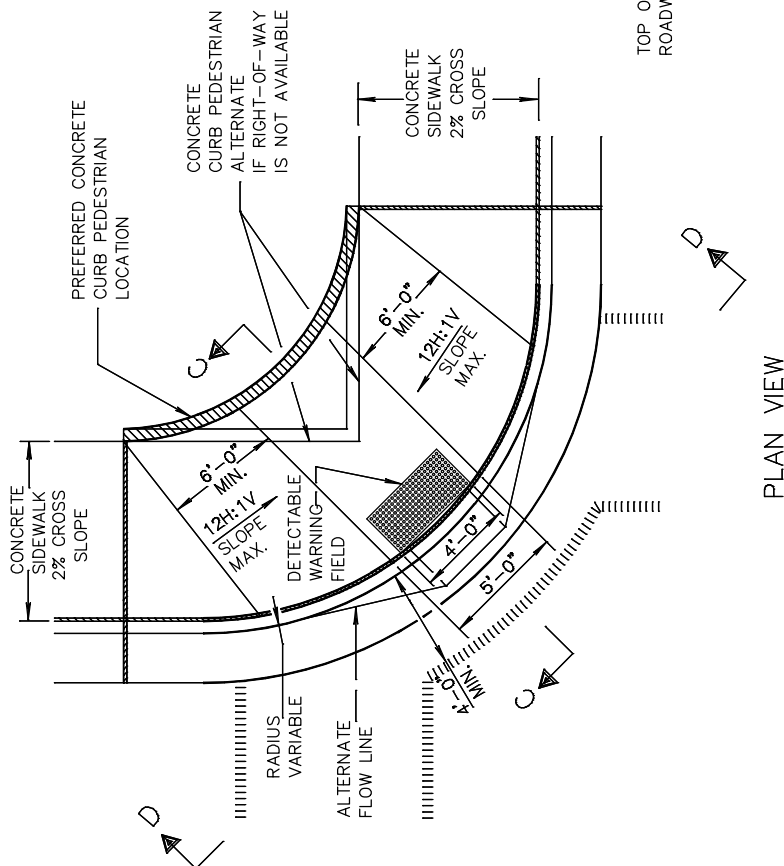
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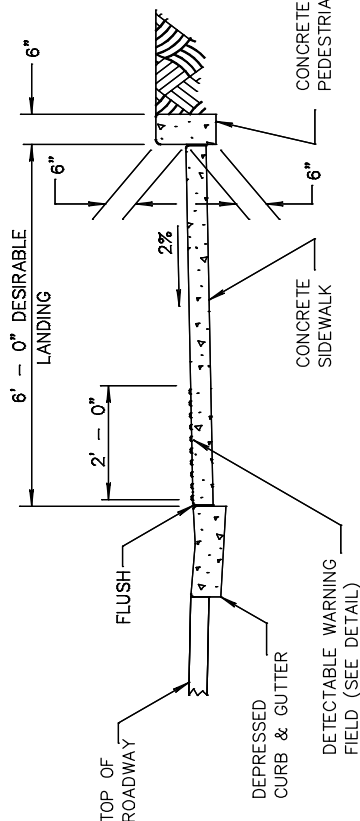
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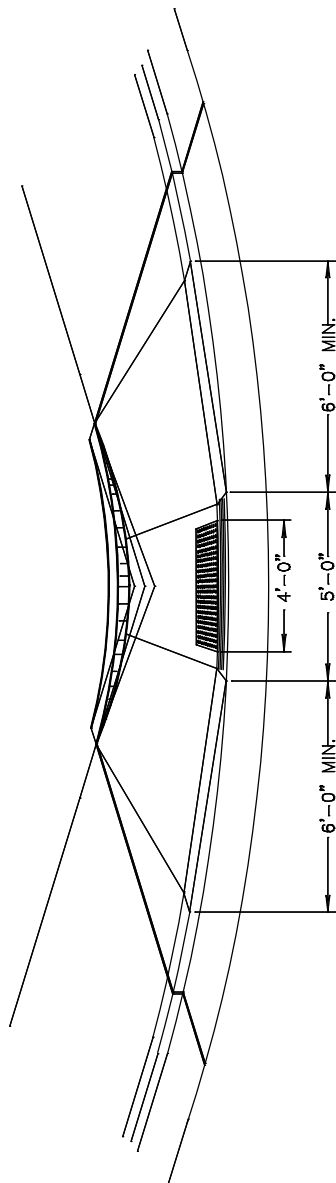
PLAN VIEW



SECTION C-C

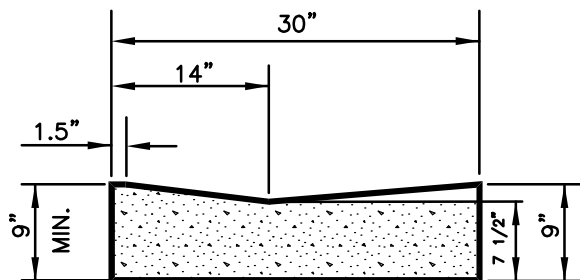
LEGEND

- EXPANSION JOINT-SIDEWALK
- CONTRACTION JOINT FIELD LOCATED
- PAVEMENT MARKING CROSSWALK (WHITE)
- ALTERNATIVE LAYOUT

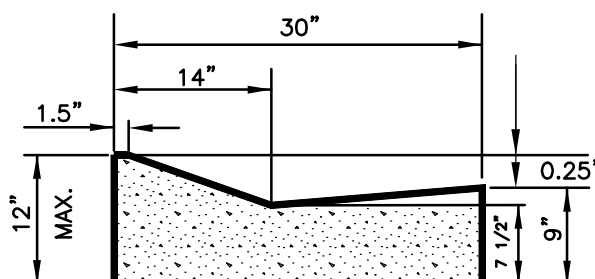


VIEW D-D

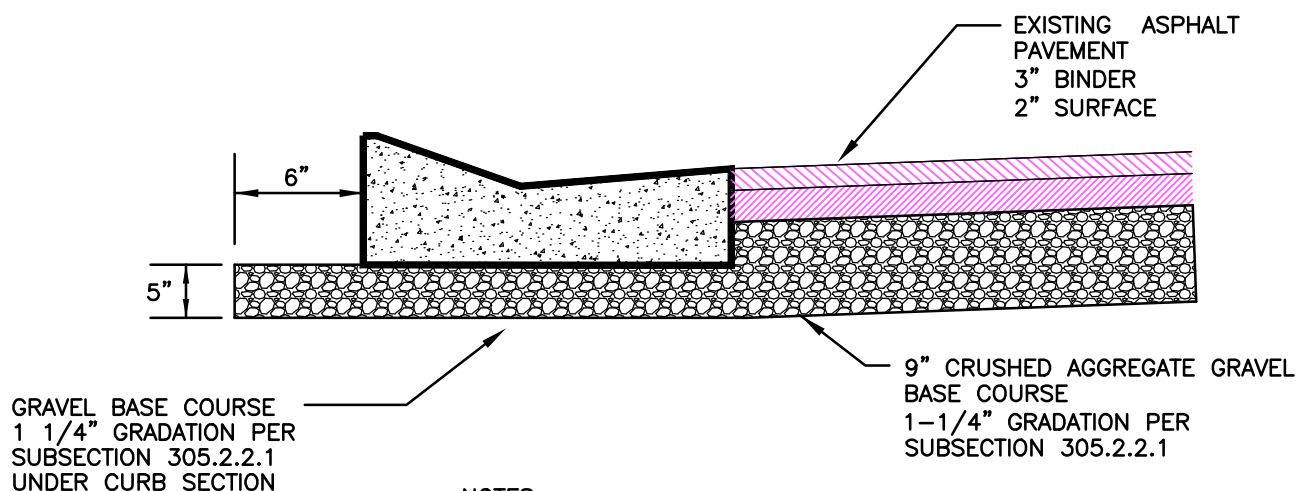
REV. 8/28/2019 RCB



**MOUNTABLE CURB DRIVEWAY
APPROACH DIMENSIONS**

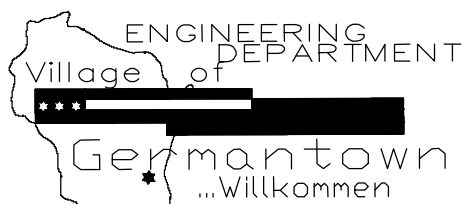


MOUNTABLE CURB MAXIMUM DIMENSIONS



- NOTES:
- INSTALL 2" DEEP CONTRACTION JOINTS AT 10' INTERVALS.
 - INSTALL 3/4" FELT AT EXPANSION JOINTS EVERY 150' AND AT ALL P.C.'S, P.T.'S.
 - ASPHALT TYPE TO BE PER CONTRACT SPECIFICATIONS.
 - NO. 4 EPOXY COATED REBAR TO BE USED TO JOIN NEW CURB WITH EXISTING CURB.

REVISED 8/28/2019 RCB



STANDARD DETAIL

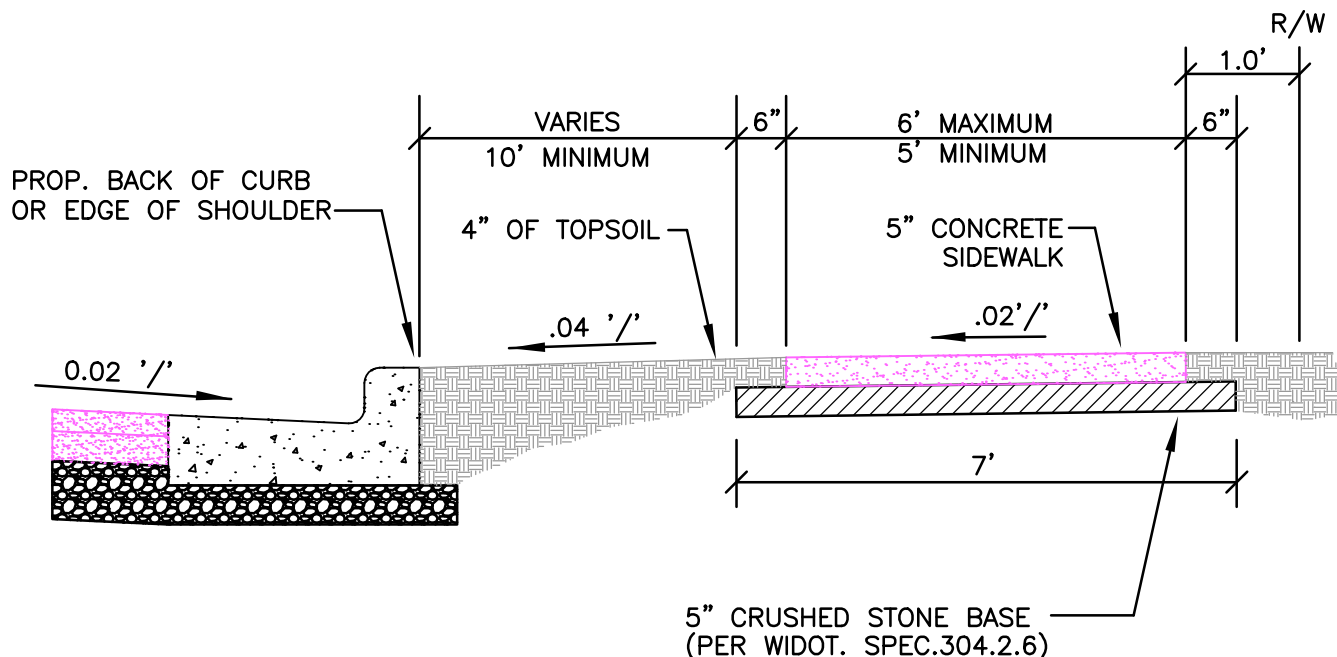


MOUNTABLE CURB AND GUTTER

REVISED 8/28/2019



NOT TO SCALE



NOTE: THE PROPOSED BACK OF WALK WILL BE LOCATED 1.00' FROM THE EXISTING R/W LINE. CHANGES TO THIS LOCATION CAN BE DONE ONLY WITH PERMISSION OF THE VILLAGE ENGINEER.

ALL DISTURBED TURF ALONG THE NEW SIDEWALK WILL BE RESTORED WITH EITHER 4" OF NEW TOPSOIL AND SOD OR 4" OF NEW TOPSOIL AND HYDROSEED.

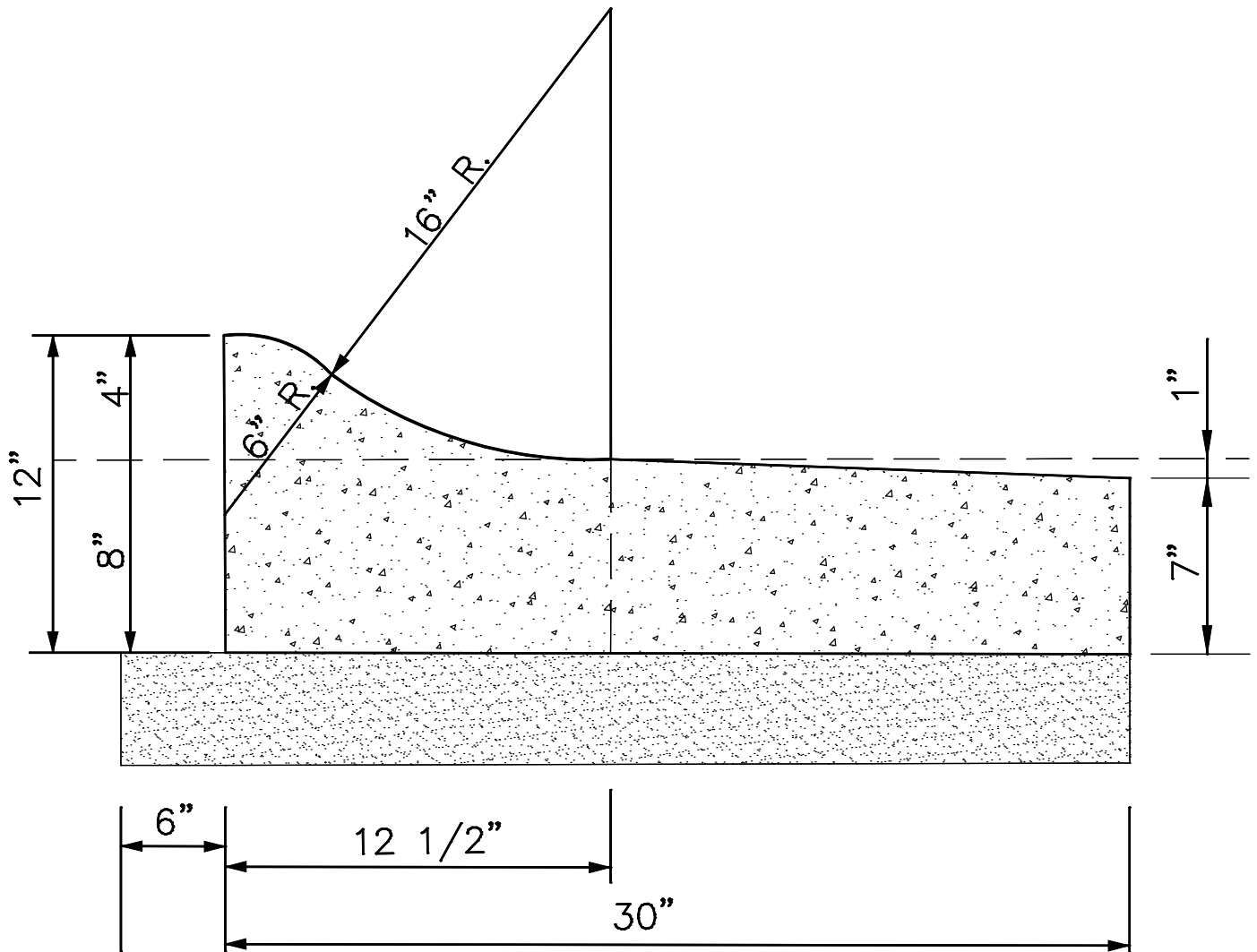
TYING NEW SIDEWALK TO EXISTING SIDEWALK WILL BE DONE BY INSTALLING 3-NO. 5 EPOXY COATED REBAR DRILLED IN TO THE EXISTING WALK PAVEMENT AT AN EQUAL SPACING AND A MINIMUM OF 4"

NOT TO SCALE

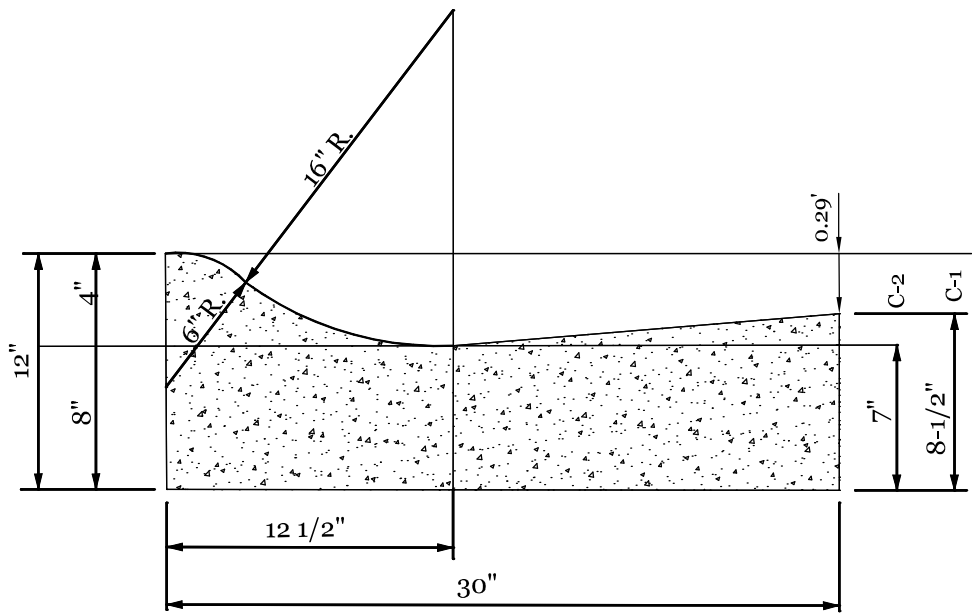


STANDARD DETAIL SIDEWALK DETAIL-CONCRETE

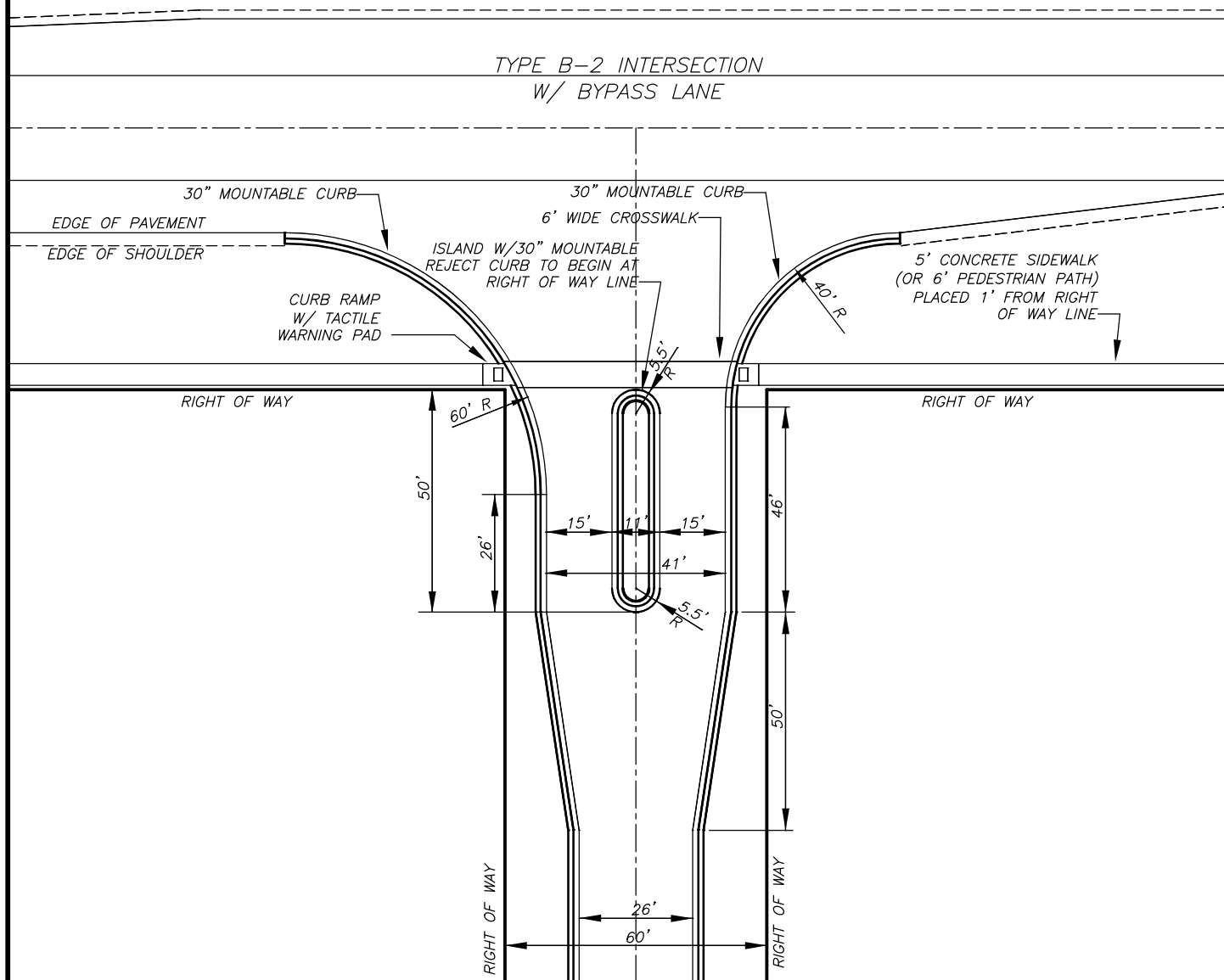
APPROVED 2/2006 REVISED 9/28/2018 RCB



1 **TYPICAL REJECT MOUNTABLE CURB DETAIL**
 3.1 NOT TO SCALE



CURB & GUTTER TYPE SCHEDULE	
TYPE C-1	SEPERATE CURB & GUTTER - LOW SIDE
TYPE C-2	SEPERATE CURB & GUTTER - HIGH SIDE



NOTE: INTERIOR SUBDIVISION ROADS ARE STANDARD RESIDENTIAL TYPICAL SECTION WITH 30-INCH MOUNTABLE CONCRETE CURB & GUTTER.

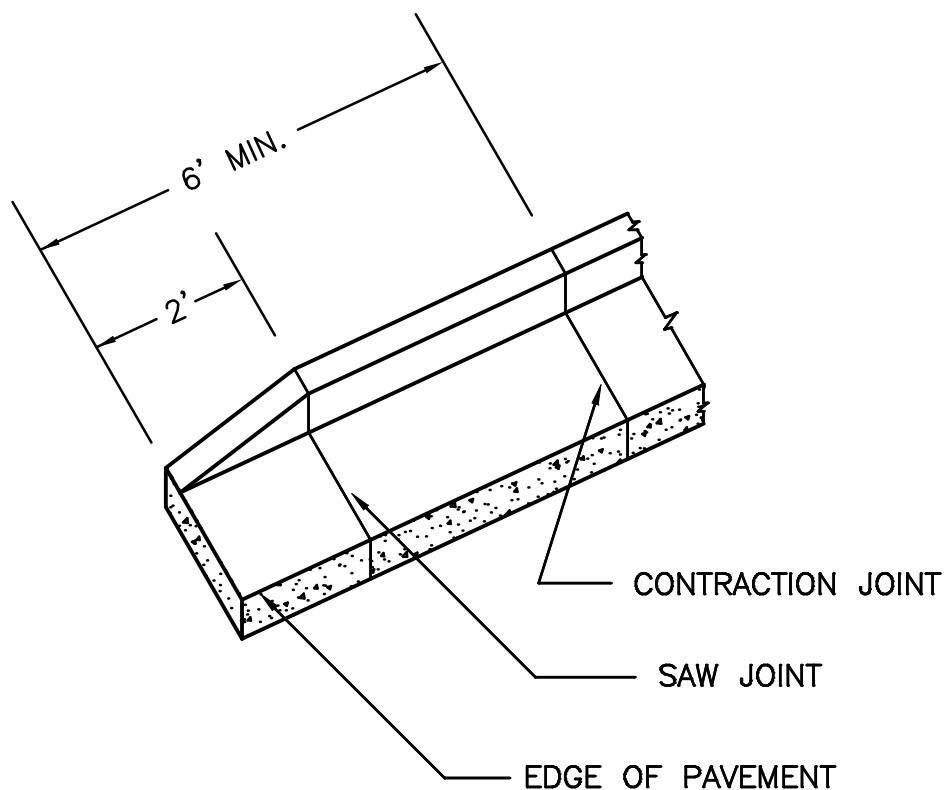
MAINTENANCE OF ALL ISLAND AREAS INCLUDING GRASS MOWING IS THE RESPONSIBILITY OF THE SUBDIVISION HOMEOWNERS ASSOCIATION.

THIS DETAIL IS A TYPE-B2 INTERSECTION DETAIL PER WISDOT AND INCLUDES THE DECELL AND ACCELL LANES PER THAT SPECIFIC DETAIL.

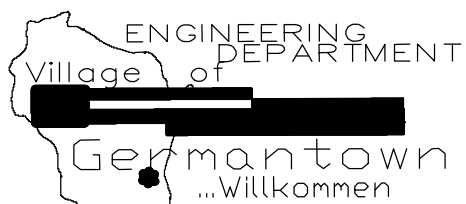
NOT TO SCALE



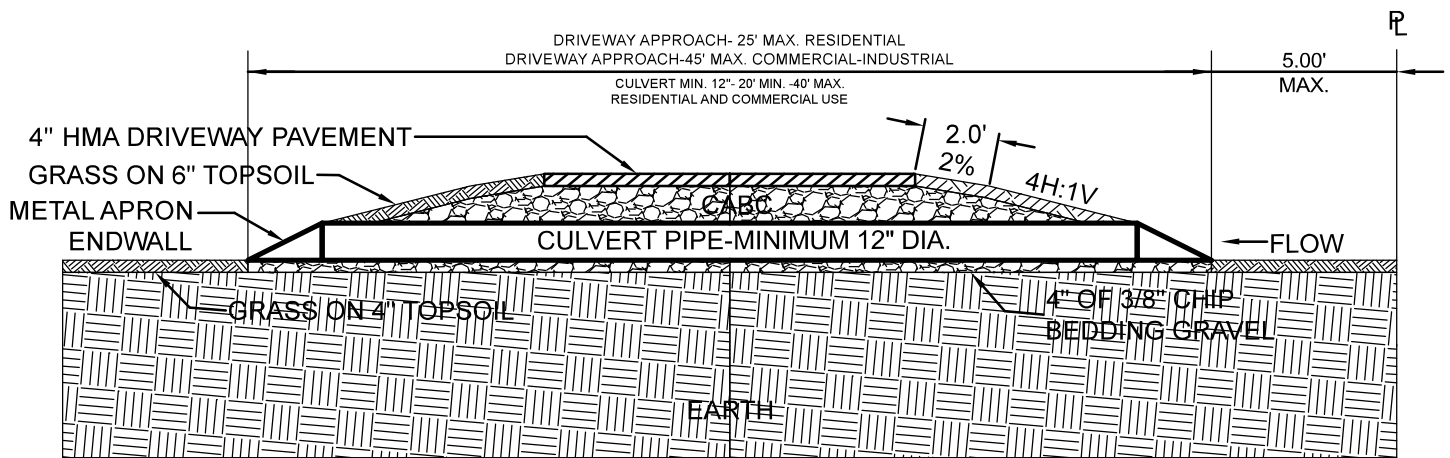
STANDARD DETAIL SUBDIVISION ENTRANCE WITH ISLAND



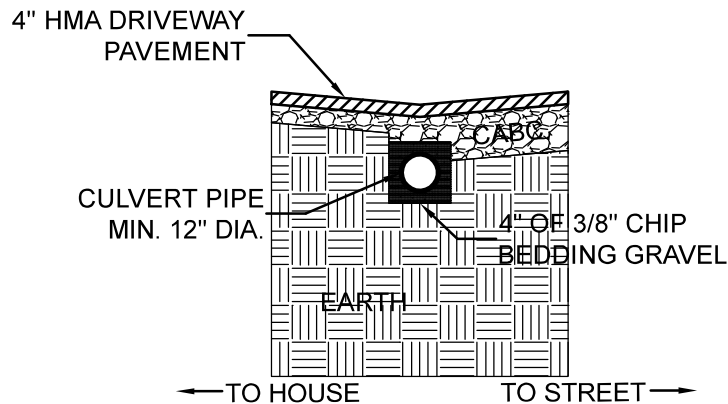
REV. 8/28/2019 RCB



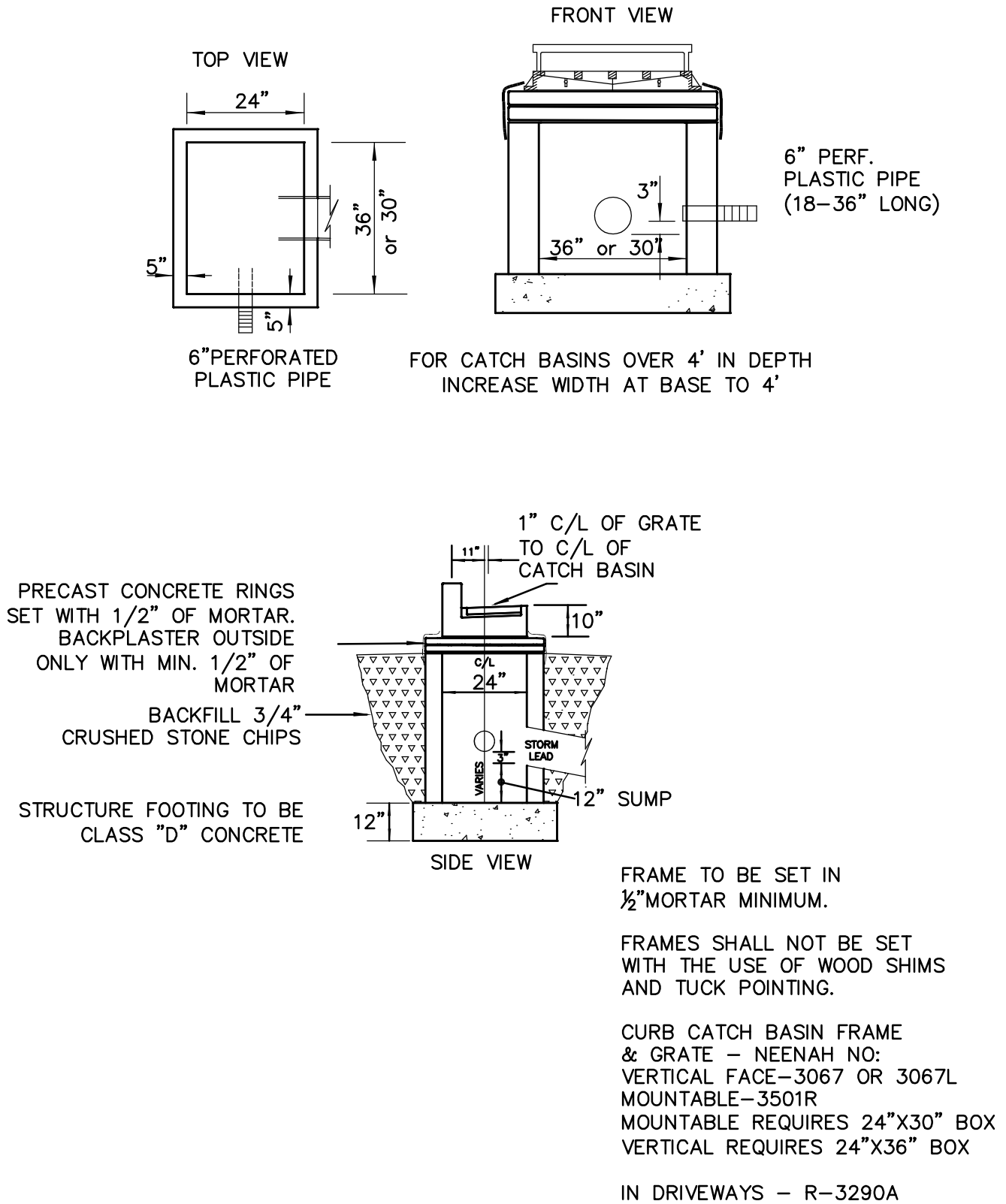
END SECTION OF CURB & GUTTER



PROFILE VIEW

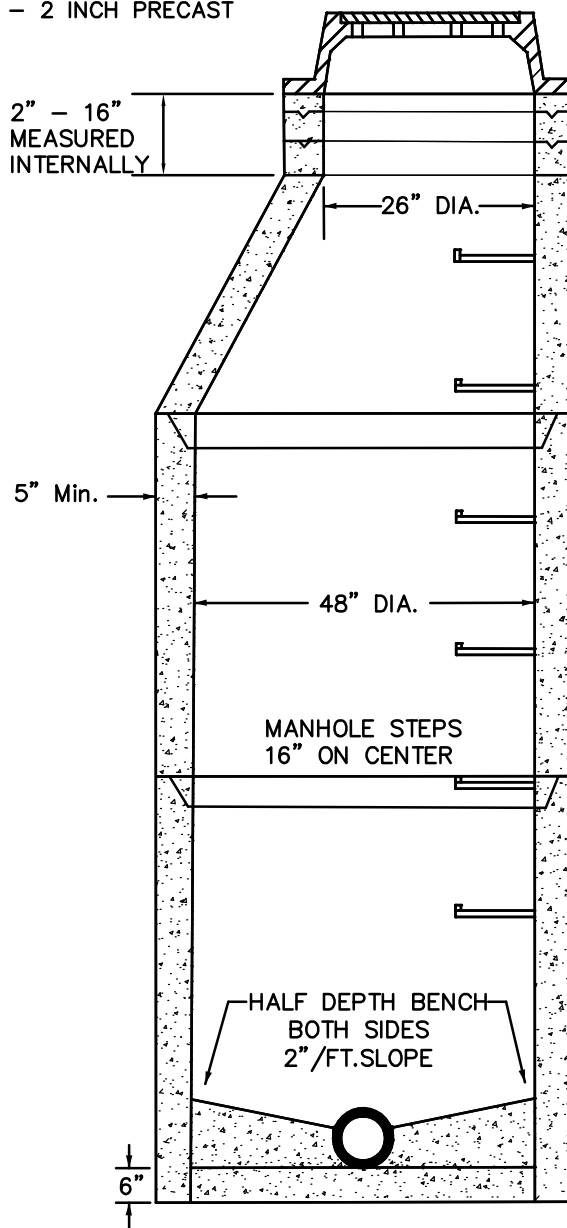


DITCH CROSS-SECTION DETAIL



MAXIMUM TOTAL CHIMNEY HEIGHT, EXCLUDING MANHOLE FRAME, SHALL NOT EXCEED 16 INCHES, WITH A MINIMUM OF 1 - 2 INCH PRECAST RING

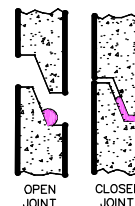
MANHOLE FRAMES AND COVERS SHALL BE NEENAH R-1661 WITH TWO (2) PICKHOLES IN THE LID. FRAMES SHALL BE STANDARD DIMENSION. NO SHORTER FRAMES WILL BE ALLOWED.



FRAME AND RINGS SHALL BE SET IN MORTAR.

THE USE OF WOOD WEDGES OR SHIMS FOR FRAME OR RING ADJUSTMENT IS NOT ALLOWED.

PRECAST CONCRETE MANHOLE BARREL SECTIONS SHALL BE JOINED WITH KENT SEAL BUTYL RUBBER SEALANT OR APPROVED EQUAL.



TYPICAL BUTYL SEALANT INSTALLATION

ALL ANNULAR SPACES BETWEEN THE PIPE AND MANHOLE WALL SHALL BE FILLED WITH BRICK AND MORTAR

NOT TO SCALE

MANHOLE FRAMES AND COVERS SHALL BE NEENAH R-1661 WITH TWO (2) PICKHOLES IN THE LID. FRAMES SHALL BE STANDARD DIMENSION. NO SHORTER FRAMES WILL BE ALLOWED.

MAXIMUM TOTAL CHIMNEY HEIGHT, EXCLUDING MANHOLE FRAME, SHALL NOT EXCEED 16 INCHES, WITH A MINIMUM OF 1 - 2 INCH PRECAST RING

2" - 16"
MEASURED
INTERNALLY

5" Min.

26" DIA.

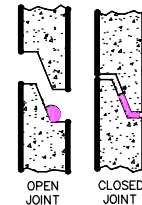
VARIES

MANHOLE STEPS

ALL STORM MANHOLES AND CATCHBASINS SHALL BE PROVIDED WITH AN "INFI-SHIELD" EXTERNAL SHIELD TO EXTEND AROUND THE OUTSIDE OF THE ADJUSTING RINGS. THE SHIELD SHALL EXTEND FROM THE FRAME TO A POINT 4" BELOW THE PRECAST MANHOLE STRUCTURE.

FRAME AND RINGS SHALL BE SET IN MORTAR.

THE USE OF WOOD WEDGES OR SHIMS FOR FRAME OR RING ADJUSTMENT IS NOT ALLOWED.



TYPICAL BUTYL
SEALANT
INSTALLATION

PRECAST CONCRETE MANHOLE BARREL SECTIONS SHALL BE JOINED WITH KENT SEAL BUTYL RUBBER SEALANT OR APPROVED EQUAL.

ALL ANNULAR SPACES BETWEEN THE PIPE AND MANHOLE WALL SHALL BE FILLED WITH BRICK AND MORTAR

NOT TO SCALE



STANDARD DETAIL



STANDARD STORM MANHOLE DETAIL

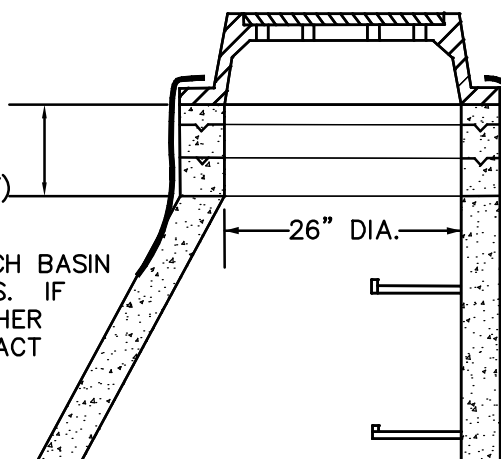
REVISED 9/4/2019

REVISED SEPTEMBER 4, 2019 RCB

SLURRY BACKFILL ALL EXCAVATIONS.

2" - 16" MEASURED INTERNALLY (NEW CONSTRUCTION ONLY)

REUSE MANHOLE AND CATCH BASIN FRAMES, COVERS, AND LIDS. IF CRACKED, CHIPPED, OR OTHER DAMAGE IS PRESENT CONTACT HIGHWAY DEPARTMENT FOR REPLACEMENT.



INSTALL 2 LAYERS OF 8 MIL POLYETHYLENE WRAP TO BOTTOM OF EXCAVATION.

FRAME AND RINGS SHALL BE SET IN A BED OF 75% NON-SHRINKING CEMENTITIOUS GROUT AND 25% TYPE M MORTAR, MIXED TO AN ACCEPTABLE CONSISTENCY. BACKPLASTER OUTSIDE ONLY WITH A MINIMUM OF 1/2" MIXTURE.

THE USE OF WOOD WEDGES OR SHIMS FOR FRAME OR RING ADJUSTMENT IS PROHIBITED.

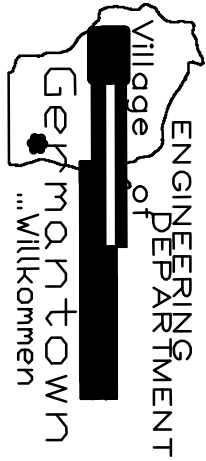
ALL ANNULAR SPACES BETWEEN THE PIPE AND MANHOLE WALL SHALL BE INSPECTED FOR CRACKS OR LOOSE MORTAR. TUCK-POINT WITH BRICK AND MORTAR AS NECESSARY.



STORM SEWER MANHOLE REBUILD DETAIL

REVISED 6/3/2010

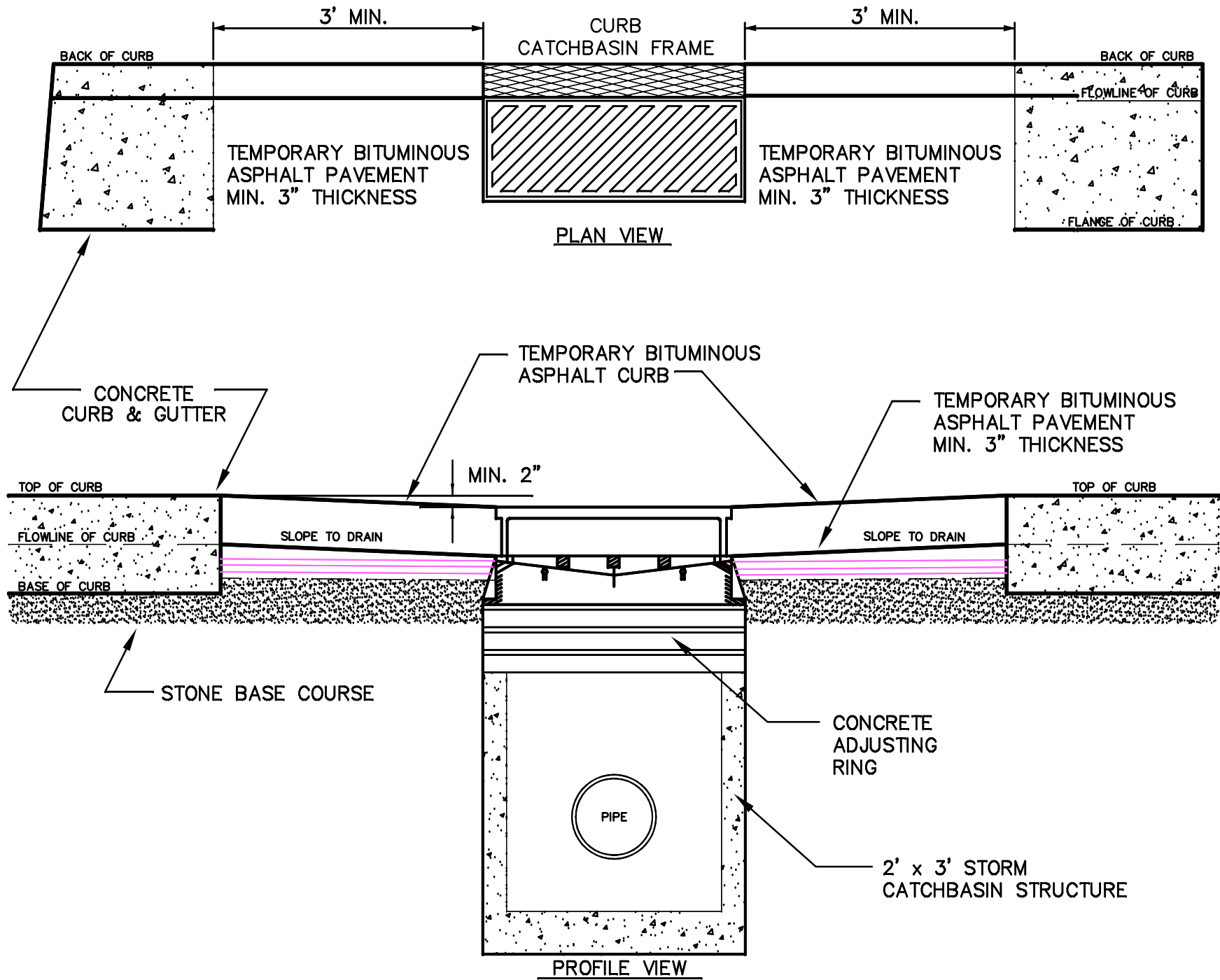
NOT TO SCALE

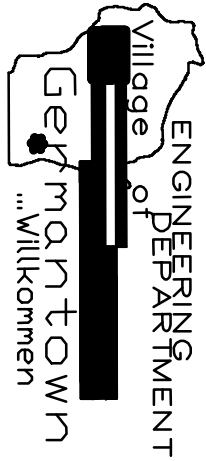


INTERIM PAVEMENT INLET INSTALLATION

REVISED 8/30/2019 RCB

NOT TO SCALE

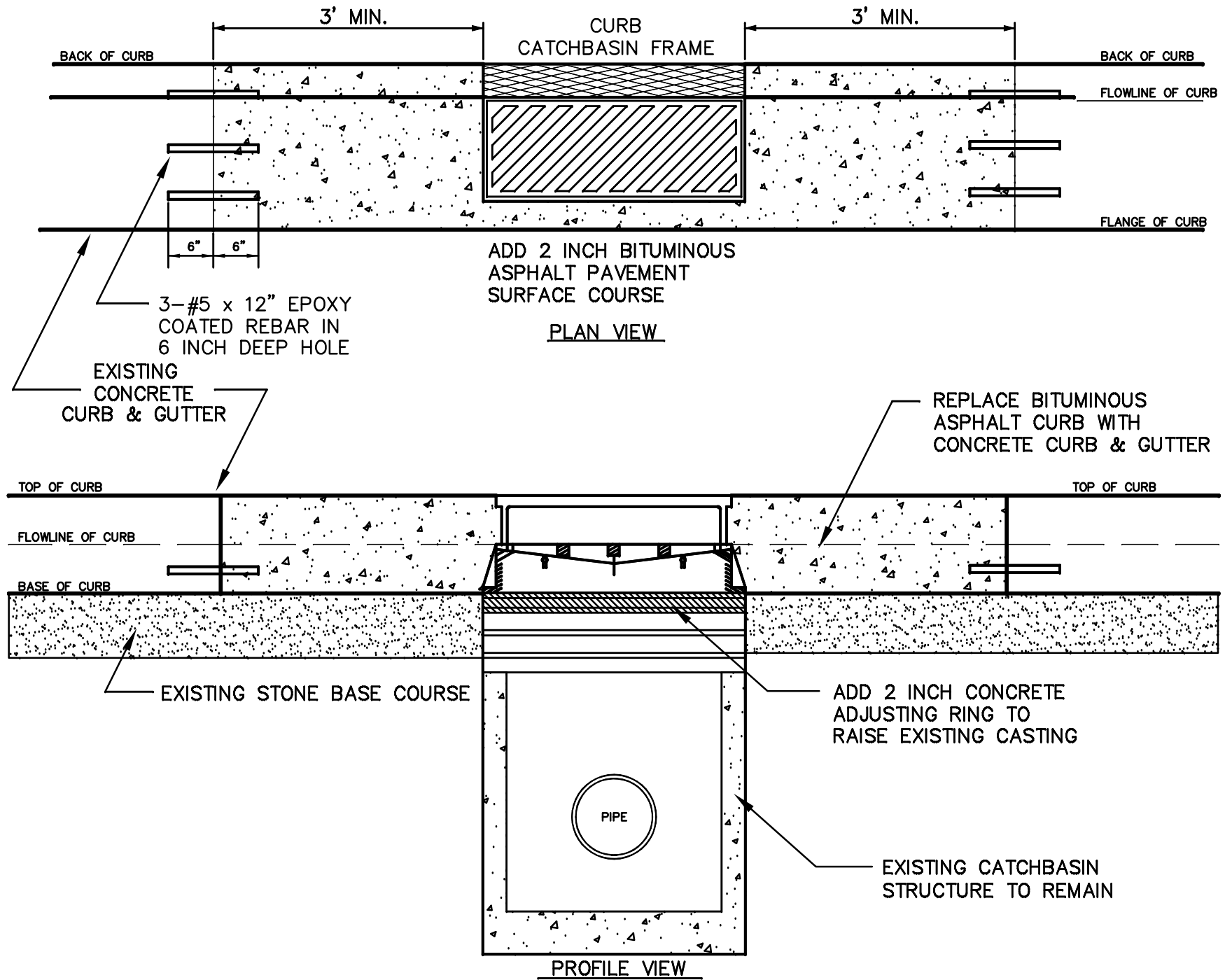


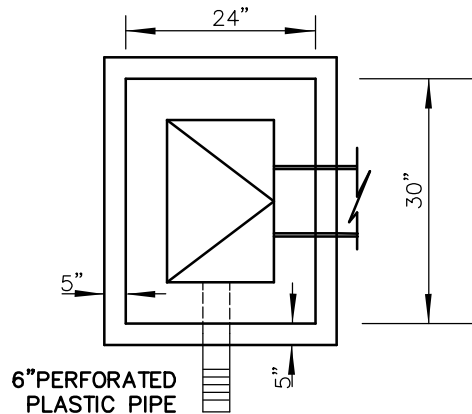


INTERIM PAVEMENT
INLET TO FINAL RIM
GRADE CONVERSION

REVISED 8/30/2019 RCB

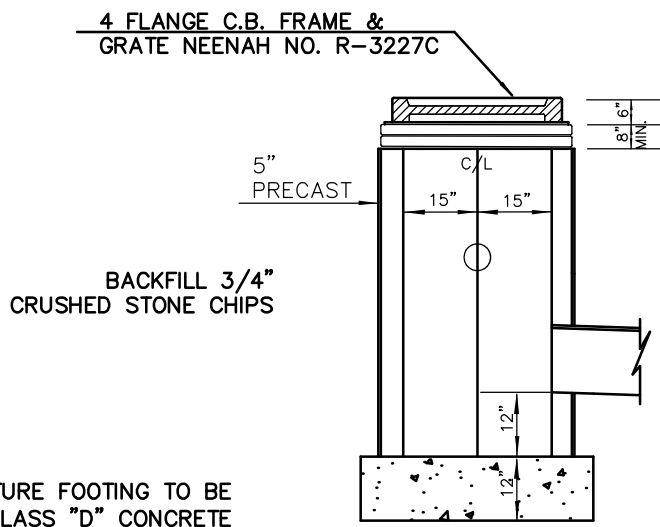
NOT TO SCALE





PLAN VIEW

NOTE: FOR DEPTHS GREATER THAN 4 FT.
INCREASE WIDTH AS SHOWN ON FILE NO. 28



PRECAST CONCRETE RINGS SET WITH
1/2" OF MORTAR.

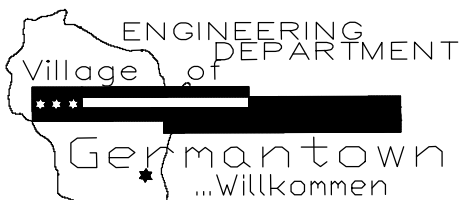
BACKPLASTER OUTSIDE ONLY WITH
MIN. 1/2" OF MORTAR

FRAME TO BE SET IN MORTAR.

FRAMES SHALL NOT BE SET WITH
THE USE OF WOOD SHIMS AND TUCK
POINTING.

PROFILE VIEW

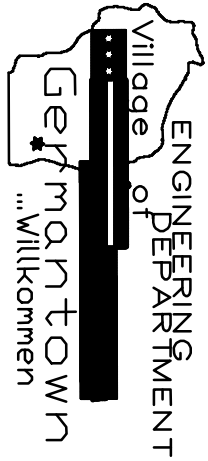
REVISED 2/3/2020 RCB



STANDARD DETAIL

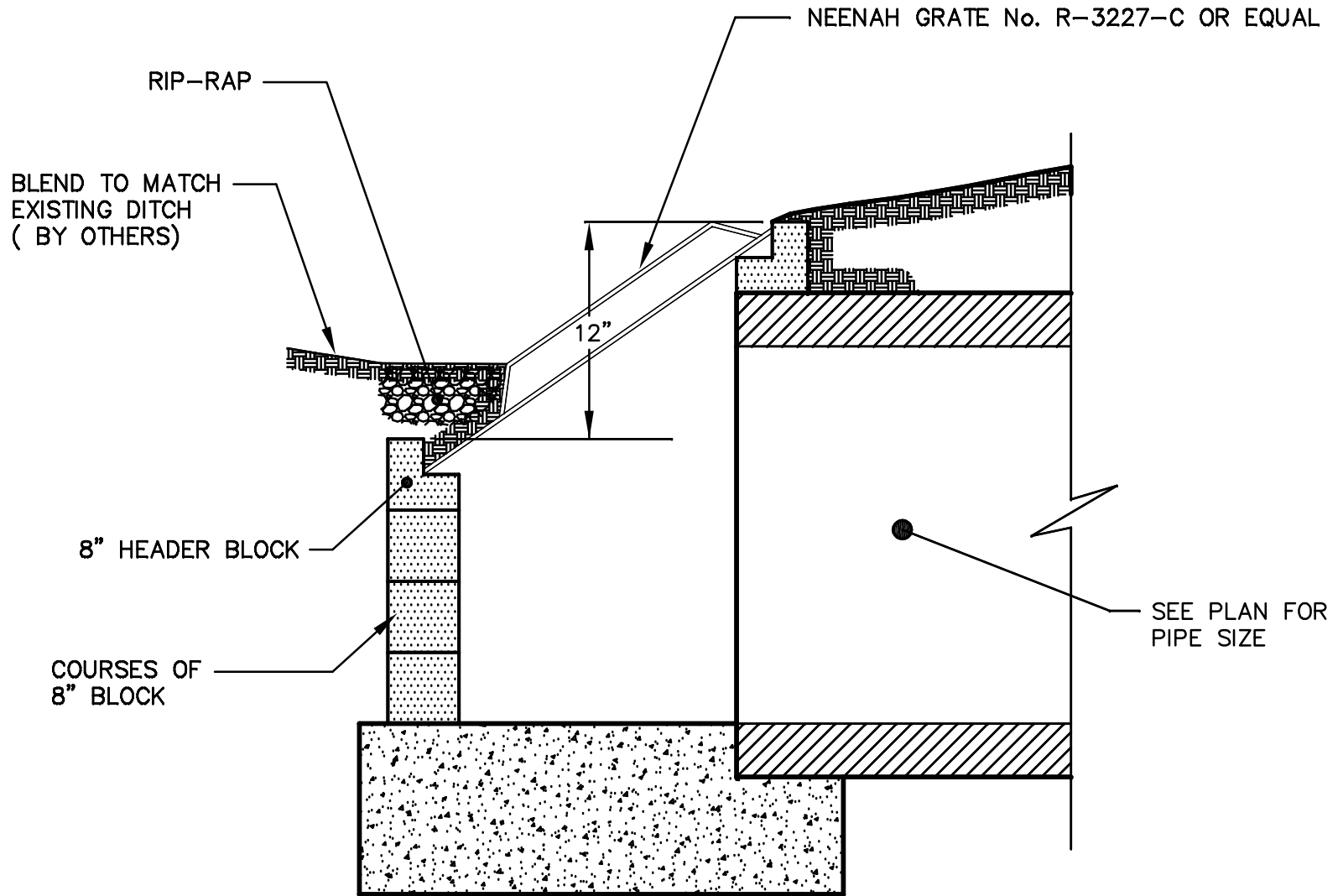


NOT TO SCALE
Page 282 of B17

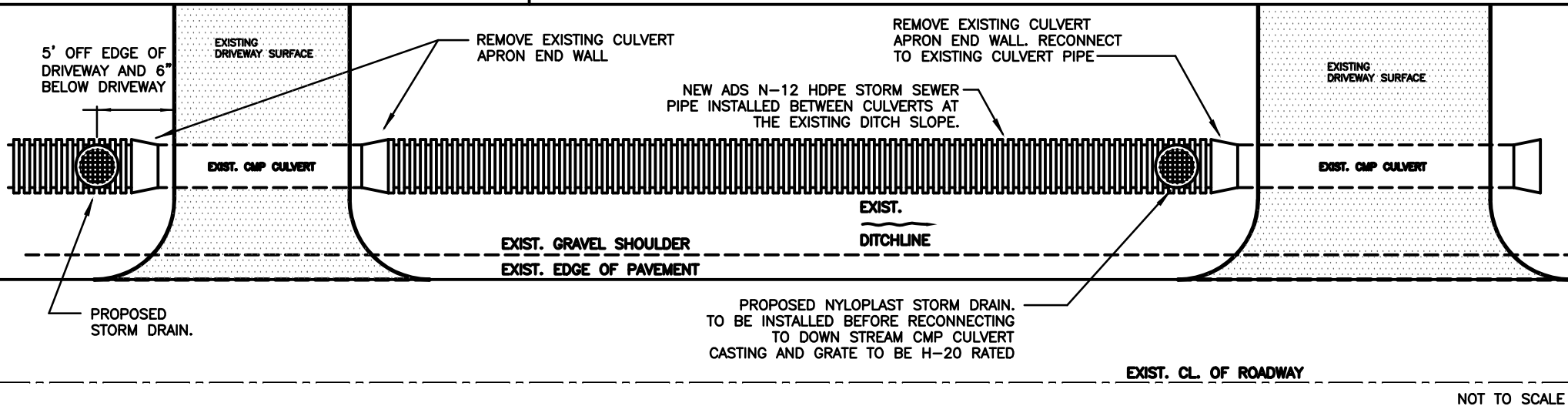
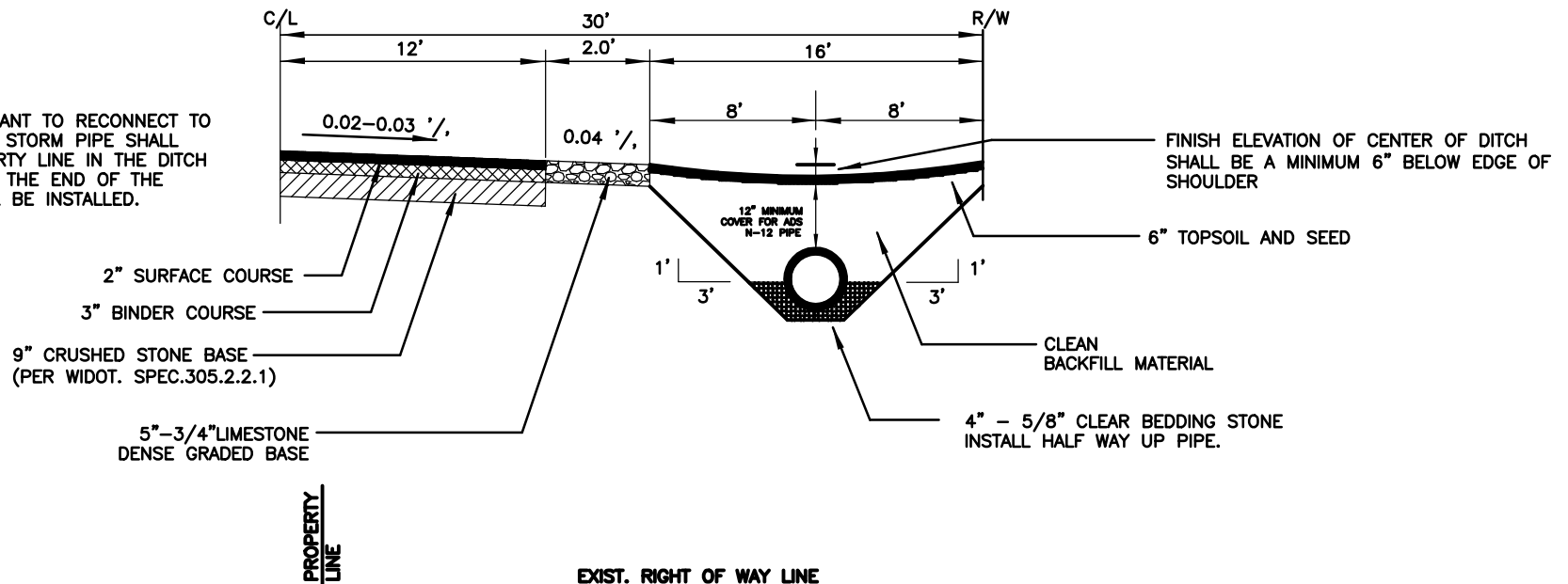


TIPPED INLET DETAIL

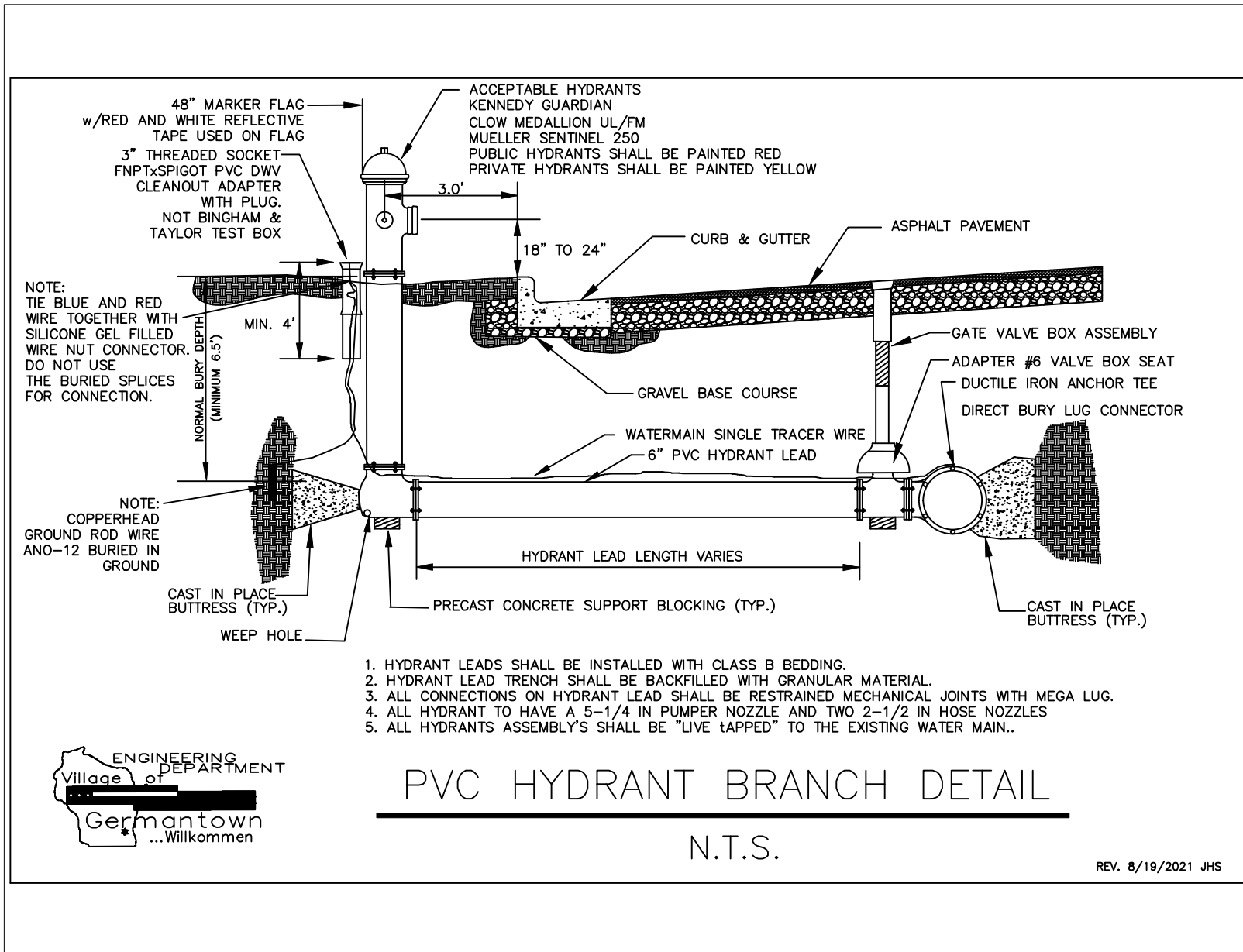
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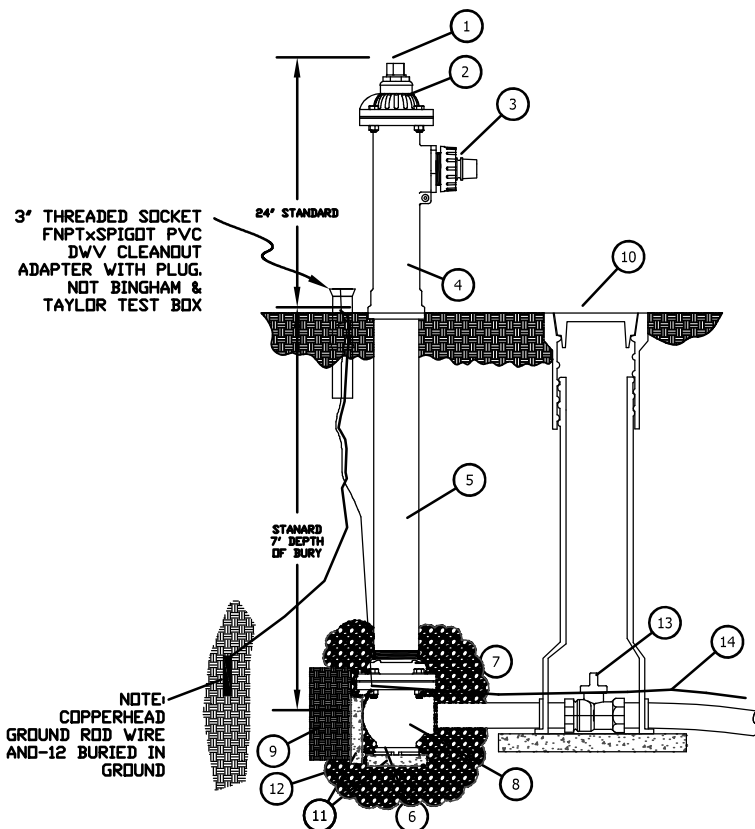


NOTE:
IF NEIGHBOR DOES NOT WANT TO RECONNECT TO
NEW HDPE PIPE THE NEW STORM PIPE SHALL
TERMINATE AT THE PROPERTY LINE IN THE DITCH
AND AN METAL APRON TO THE END OF THE
STORM SEWER PIPE SHALL BE INSTALLED.



ADS N12 DITCH ENCLOSURE PIPING DETAIL
TYPICAL CROSS SECTION— RURAL





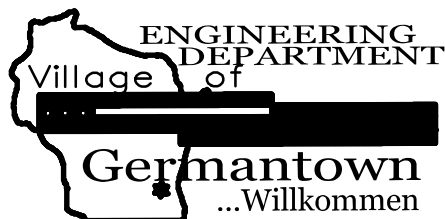
ECLIPSE NO. 2 HYDRANT SPEC SHEET

1. ECLIPSE POST HYDRANT SHALL BE SELF-DRAINING, NON-FREEZING, COMPRESSION TYPE WITH 2-3/16" MAIN VALVE OPENING. INLET CONNECTION SHALL BE (2" FIP, 2-1/2" FIP, 3" FIP, 2" MJ, 3" MJ OR 4" MJ). OUTLET SHALL BE (1-1/4", 1-1/2", 2" OR 2-1/2" IP OR NST). STANDARD DEPTH OF BURY IS 3.0'.
2. ALL WATER FLOW SHALL PASS THRU A 3-1/2" FBE COATED STEEL PIPE AND CAST IRON TOP STOCK WATERWAY.
3. ALL WORKING PARTS SHALL BE SERVICEABLE FROM ABOVE GROUND WITH NO DIGGING OR REPLACEMENT NEEDED.
4. HYDRANT SHALL BE SET IN 4 CUBIC FEET OF CRUSHED CONCRETE TO ALLOW FOR PROPER DRAINAGE OF HYDRANT. RECOMMENDATION OF THE AWWA SHOULD BE FOLLOWED WHEN INSTALLING THE HYDRANT.
5. THE #2 ECLIPSE POST HYDRANT AS MANUFACTURED BY THE KUPFERLE FOUNDRY, ST. LOUIS MO. 63102 OR APPROVED EQUAL.

ITEM	DESCRIPTION	NOTES
1	OPERATING SCREW	
2	TOP CAP	
3	SIDE CAP	
4	TOP STOCK	
5	3-1/2" FBE COATED STEEL PIPE	
6	DRAIN HOLE	
7	COUPLING	
8	INLET VALVE BODY	
9	UNDISTURBED EARTH	BY OTHERS
10	VALVE BOX	BY OTHERS
11	THRUST BLOCKS	BY OTHERS
12	CRUSHED CONCRETE BACKFILL	BY OTHERS
13	HYDRANT SHUT-OFF VALVE-2"	BY OTHERS
14	TRACER WIRE	BY OTHERS

3 ECLIPSE NO. 2 FLUSHING HYDRANT DETAIL

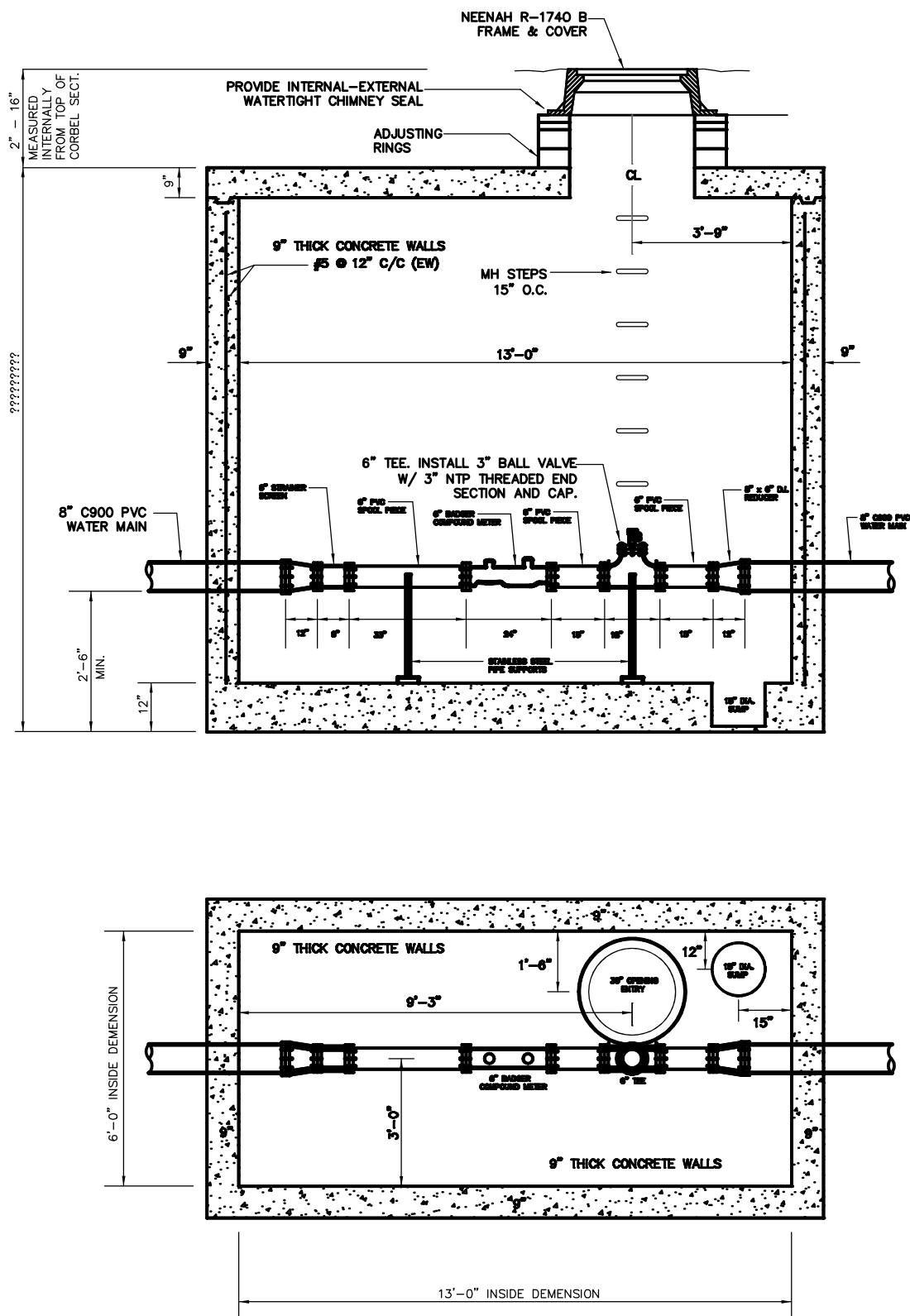
5 DETAIL- N.T.S.



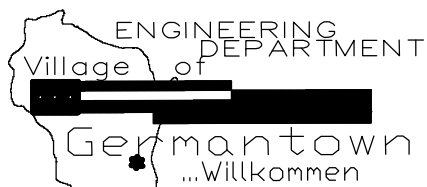
NOT TO SCALE

ECLIPSE NO. 2 FLUSHING HYDRANT DETAIL

REVISED: 09/4/2019 RCB

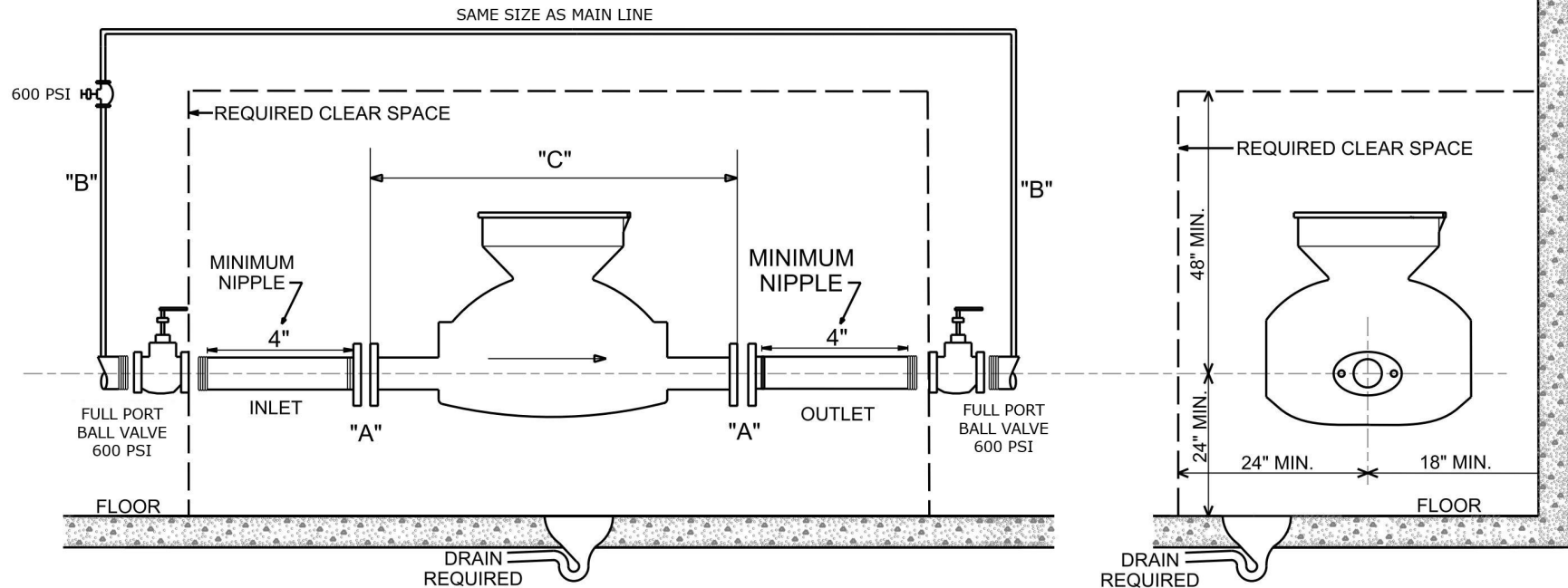


REVISED 8/30/2019 RCB



STANDARD WATER MAIN METER VAULT DETAIL

ALL PIPE AND VALVES TO BE
BRASS AND/OR COPPER

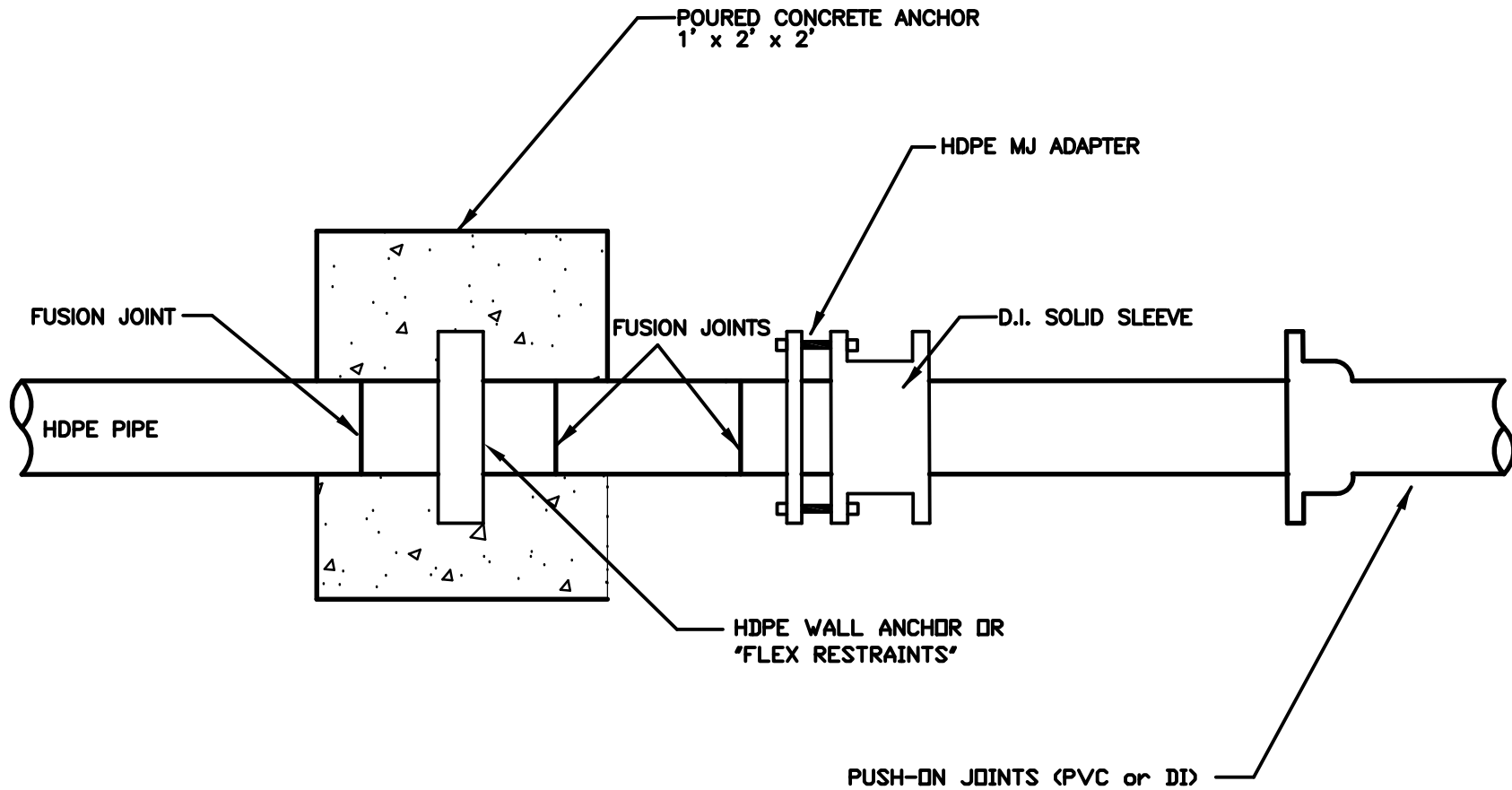


"A" - ELLIPTICAL FLANGES AND GASKETS SUPPLIED BY CONTRACTOR/OWNER
 "B" - BYPASS REQUIRED
 "C" - METER LAY LENGTH (BY METER SIZE): 1 1/2" = 13"
 2" = 9 3/4"

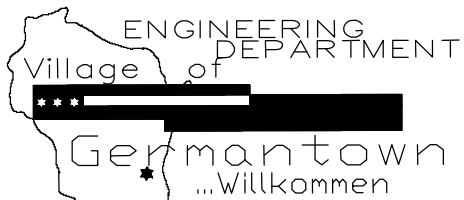


STANDARD 1 1/2" - 2" METER INSTALLATION

NOT TO SCALE



REVISED 8/28/2019 RCB



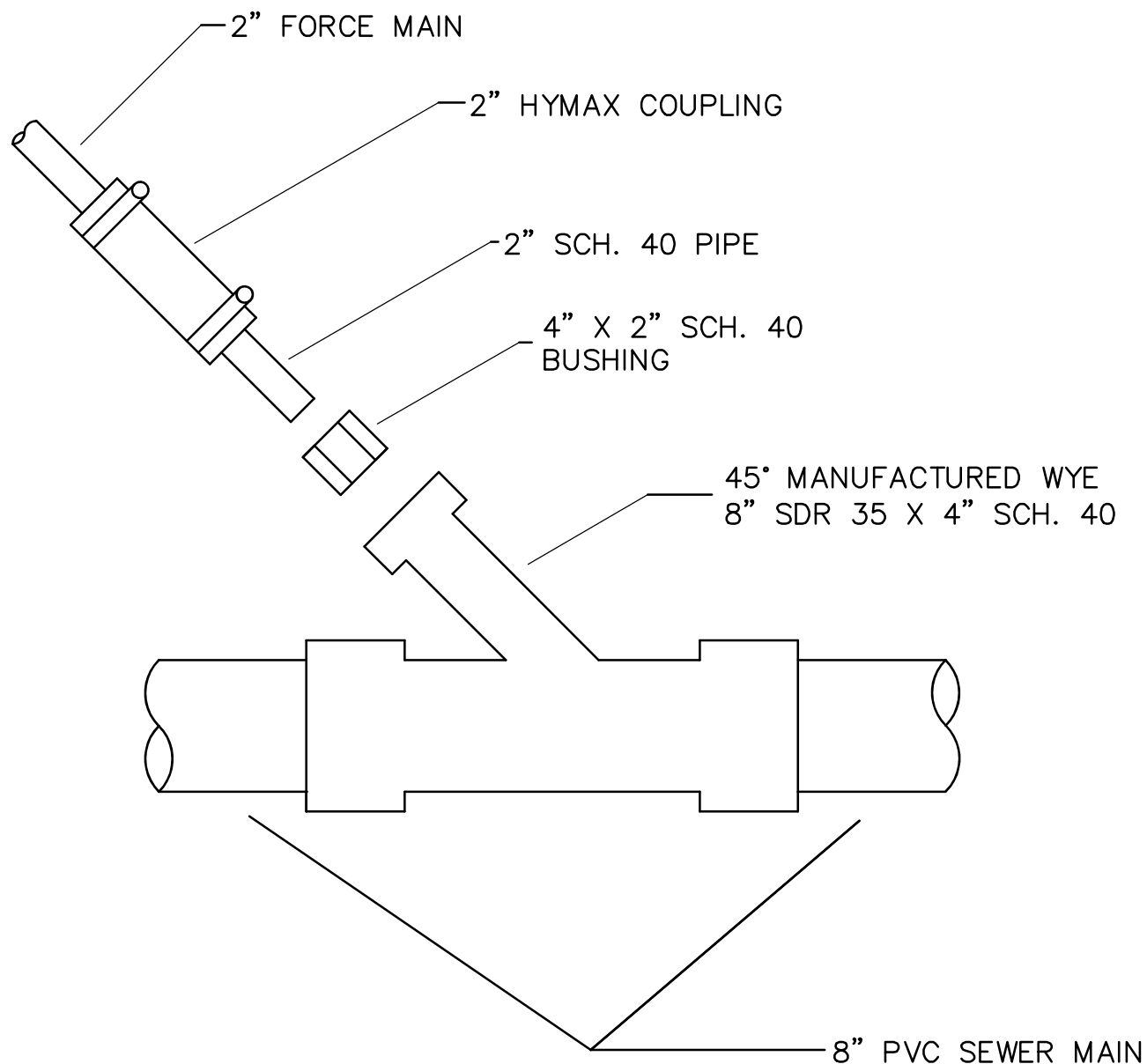
STANDARD DETAIL



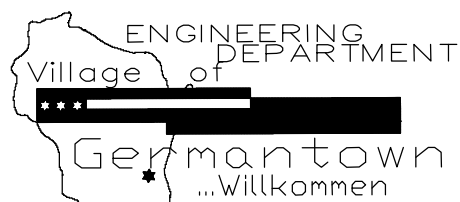
HDPE JOINT RESTRAINT DETAIL

REVISED 8/28/2019

NOT TO SCALE



REVISED 8/28/2019 RCB



HYMAX FORCE MAIN
LATERAL CONNECTION

NOT TO SCALE

MAXIMUM TOTAL CHIMNEY HEIGHT EXCLUDING MANHOLE FRAME, SHALL NOT EXCEED 16 INCHES AND BE A MINIMUM OF 2". ALL CHIMNEY'S SHALL BE BUILT ACCORDING TO THE SAN. MH. CHIMNEY ASSEMBLY DETAILS. ASSEMBLY DIFFERS FOR MH. IN PAVEMENT OR TURF.

FRAME AND COVER IN PAVED AREAS:
NEENAH R-1661 W/SELF SEALING COVER & CONCEALED PICKHOLES.
ALL MANHOLES SHALL REQUIRE A 2" PAVING RING, NEENAH R-1979 SERIES REF.
1661-7158, SET TO 1/4" BELOW FINISH PAVEMENT GRADE.

IN TURF AREAS:
NEENAH R-1661 BOLT DOWN GASKETED SELF-SEALING LID & 2 CONCEALED PICKHOLES. FRAMES SHALL BE BOLTED TO THE CHIMNEY W/1/2" DIA. STAINLESS STEEL ANCHOR BOLTS EXTENDING 4" INTO CHIMNEY

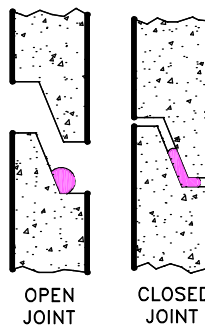
ALL CHIMNEY'S SHALL BE BUILT USING VILLAGE SPECIFICATIONS. RINGS SHALL BE INSTALLED PER MANUFACTURES INSTRUCTIONS.

NOTE:

ALL SANITARY SEWER MANHOLES AND ALL SAMPLING MANHOLES SHALL HAVE A MINIMUM PITCH OF 0.10' THRU THE TROUGH, FROM END TO END, UNLESS OTHERWISE DIRECTED BY THE VILLAGE ENGINEER.

ALL SANITARY SAMPLING MANHOLES SHALL BE BUILT USING A PRECAST CONCRETE CONE SECTION. CONCRETE FLAT TOP SECTIONS SHALL NOT BE ALLOWED UNLESS APPROVED BY THE VILLAGE ENGINEER

PRECAST CONCRETE MANHOLE BARREL SECTIONS SHALL BE JOINED WITH AN BUTYL RUBBER SEALANT OR APPROVED EQUAL.



TYPICAL BUTYL SEALANT INSTALLATION

EXTERNAL JOINT SEAL SHALL BE MACWRAP EXTERNAL JOINT SEALERS (TYP.)

THE ANNULAR SPACE BETWEEN THE SPRING LINE OF THE PIPE AND MANHOLE WALL SHALL BE FILLED WITH CONCRETE.

ADAPTOR, INC.
INTERNAL/EXTERNAL
FRAME/CHIMNEY SEAL

2" - 16"
MEASURED
INTERNALLY
FROM TOP OF
CORBEL SECTION

2 LAYERS
OF 8 MIL
POLYETHYLENE
WRAP

5" MIN.

26" DIA.

48" DIA. MIN.

MANHOLE STEPS
16" ON CENTER

HALF DEPTH BENCH
BOTH SIDES
2"/FT. SLOPE

6"

MIN. 4" GRAVEL STONE BASE

SPRAY EPOXY
COATINGS

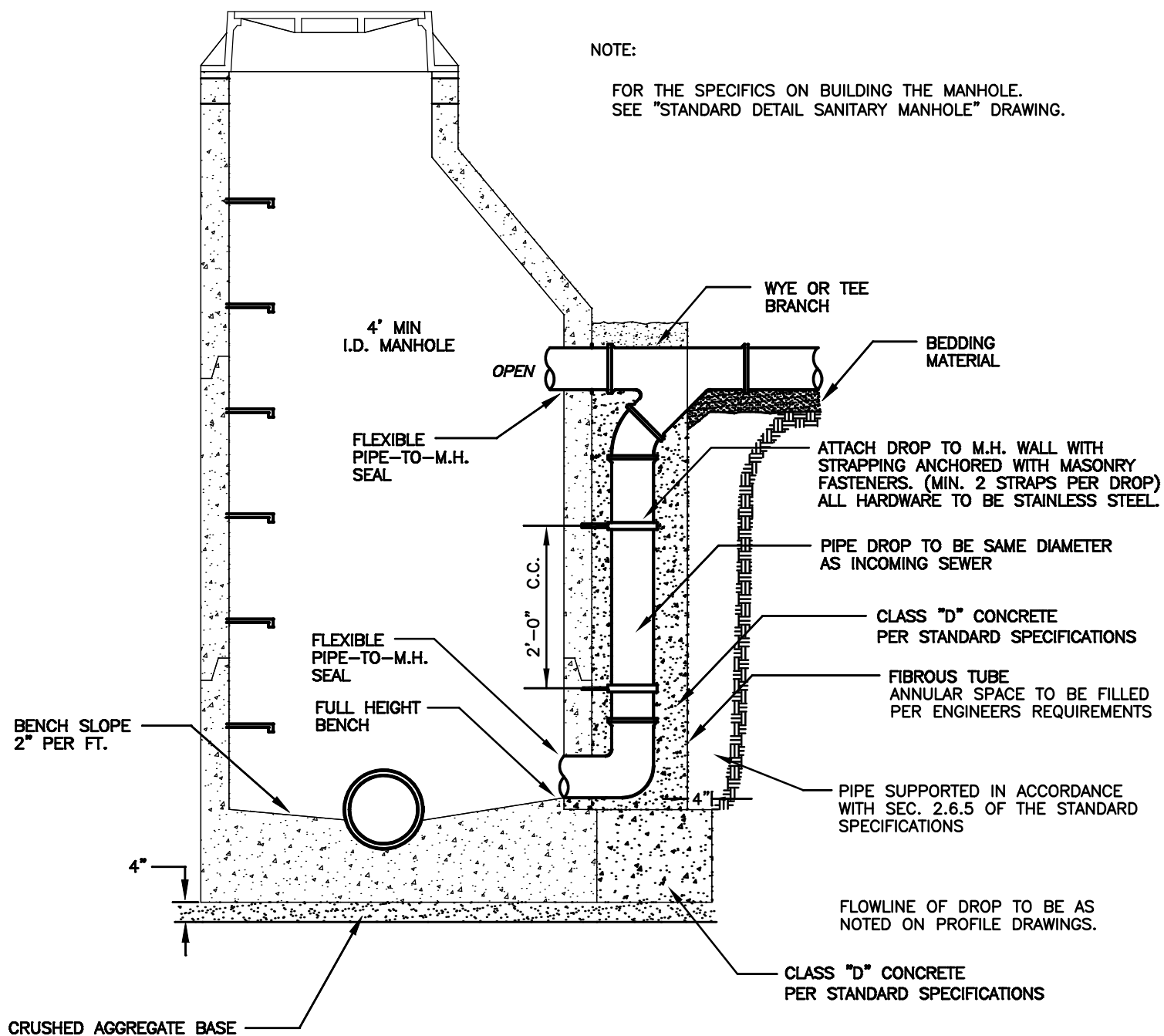
MH EXTERIOR: 2 COATS (BLACK) OF AMERON INTERNATIONAL, AMERCOAT 78 HB AT 8-10 MILS EA.
MH INTERIOR: 2 COATS (WHITE) OF PERMITE PCS-9043 TYPE II PERMOX PIPE GLAZE AT 20 MILS EA.
COATINGS SHALL BE APPLIED BY SUPPLIERS AT THE PLANT.



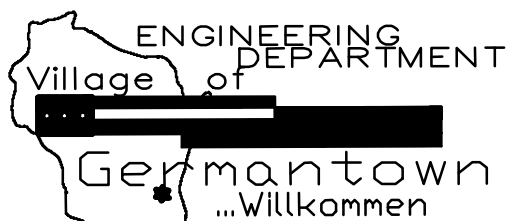
STANDARD SANITARY MANHOLE & SAMPLING MANHOLE DETAIL

REVISED DATE: 10/11/2019 FJR

NOT TO SCALE
Page 292 of B17

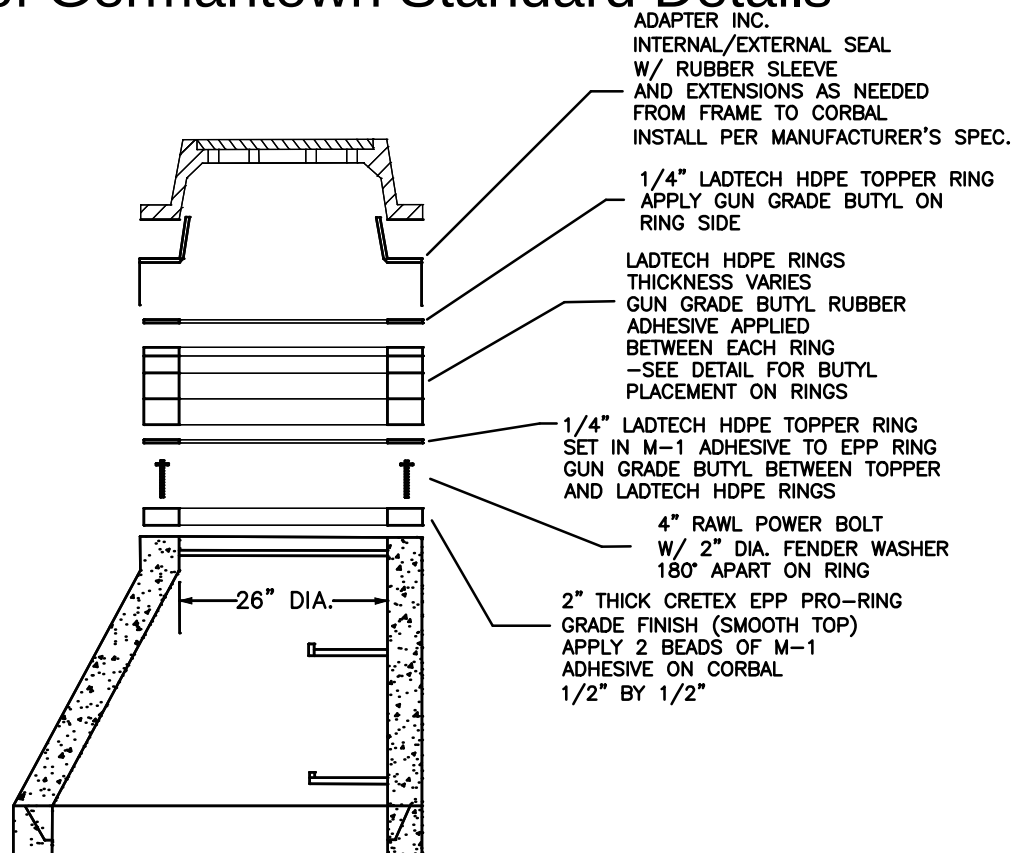


NOT TO SCALE

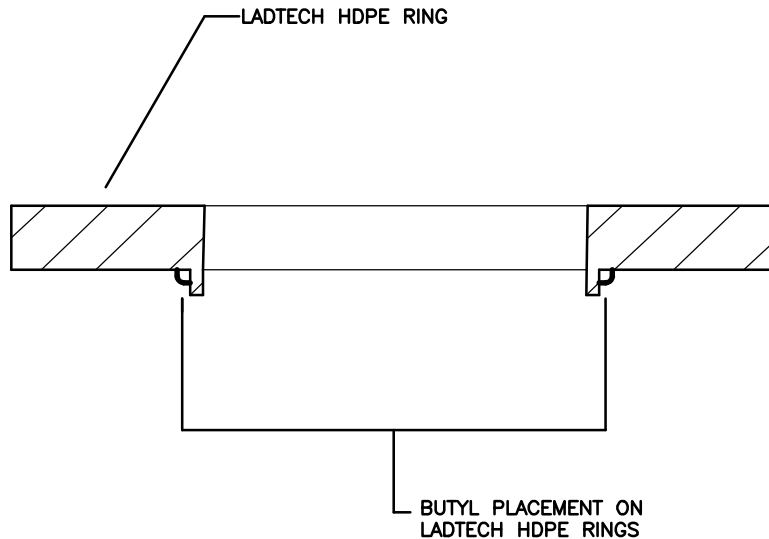


STANDARD DETAIL OUTSIDE DROP PRECAST SANITARY MANHOLE

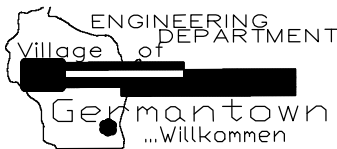
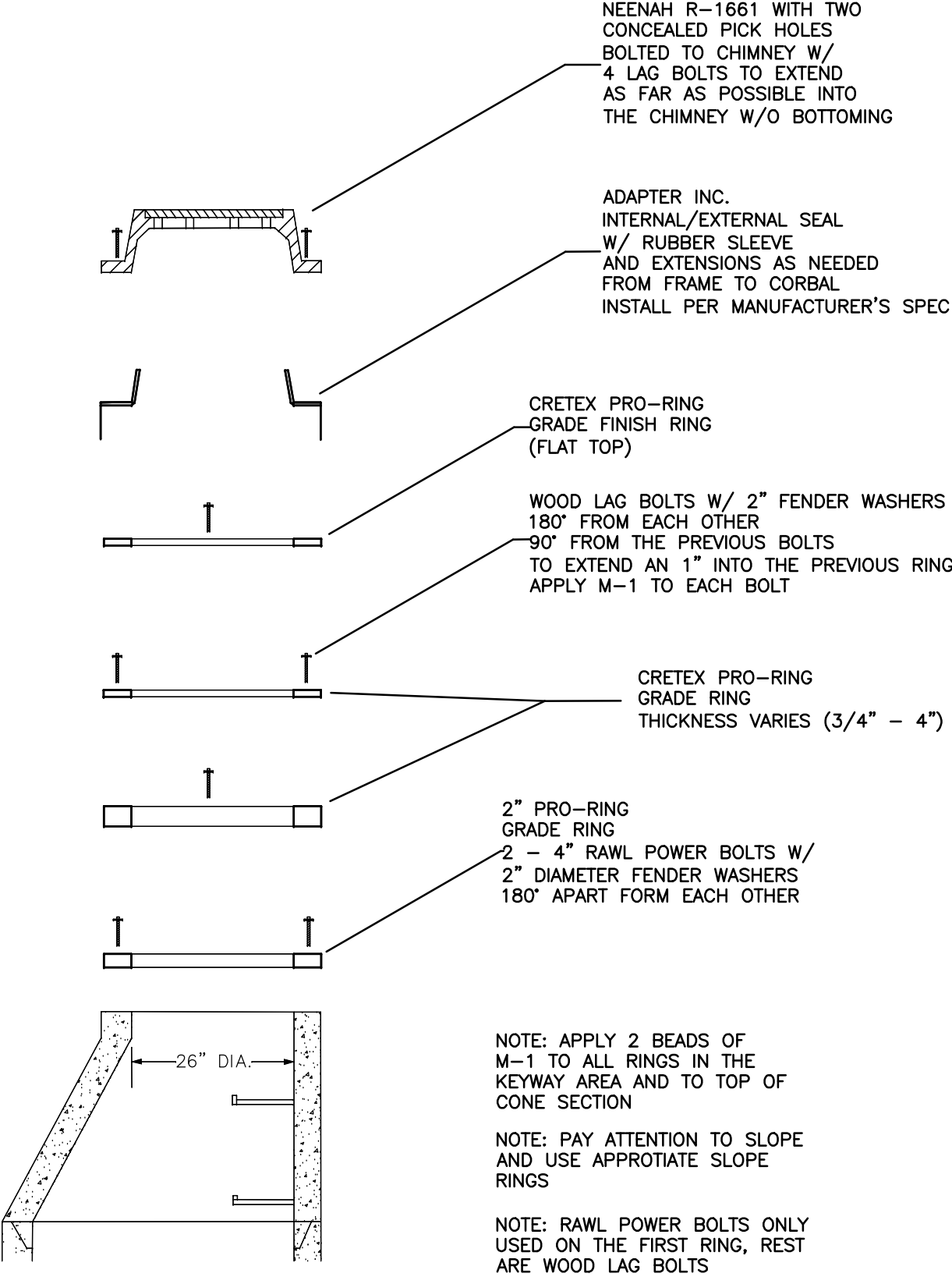
REVISED SEPTEMBER 3, 2019 RCB



1 SANITARY SEWER MANHOLE CHIMNEY ASSEMBLY IN PAVEMENT
NOT TO SCALE



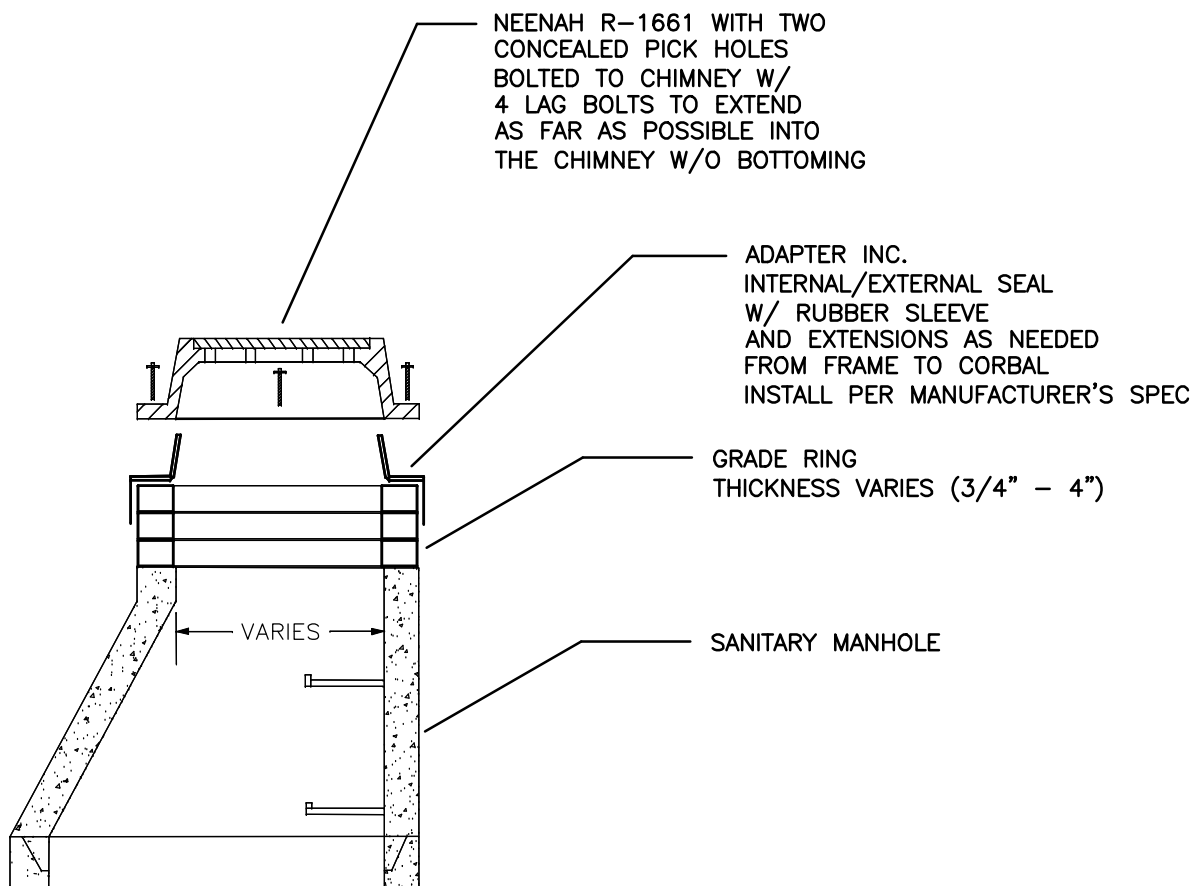
2 BUTYL PLACEMENT ON LADTECH RINGS
NOT TO SCALE



SANITARY MANHOLE CHIMNEY
ASSEMBLY DETAIL IN TURF-1

REVISED: SEPTEMBER 3, 2019 RCB

NOT TO SCALE



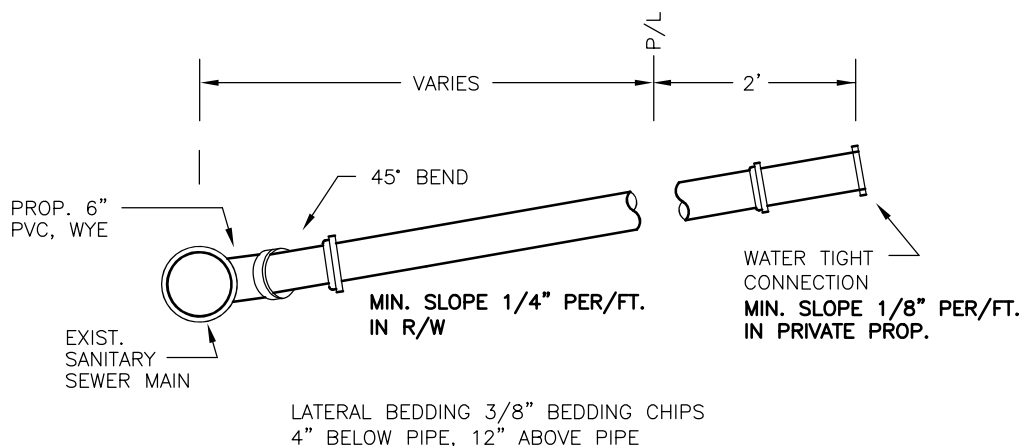
AS PER VILLAGE STANDARDS, ALL EXISTING SANITARY MANHOLE STRUCTURES, SHALL BE RETROFITTED TO VILLAGE SPECIFICATIONS.



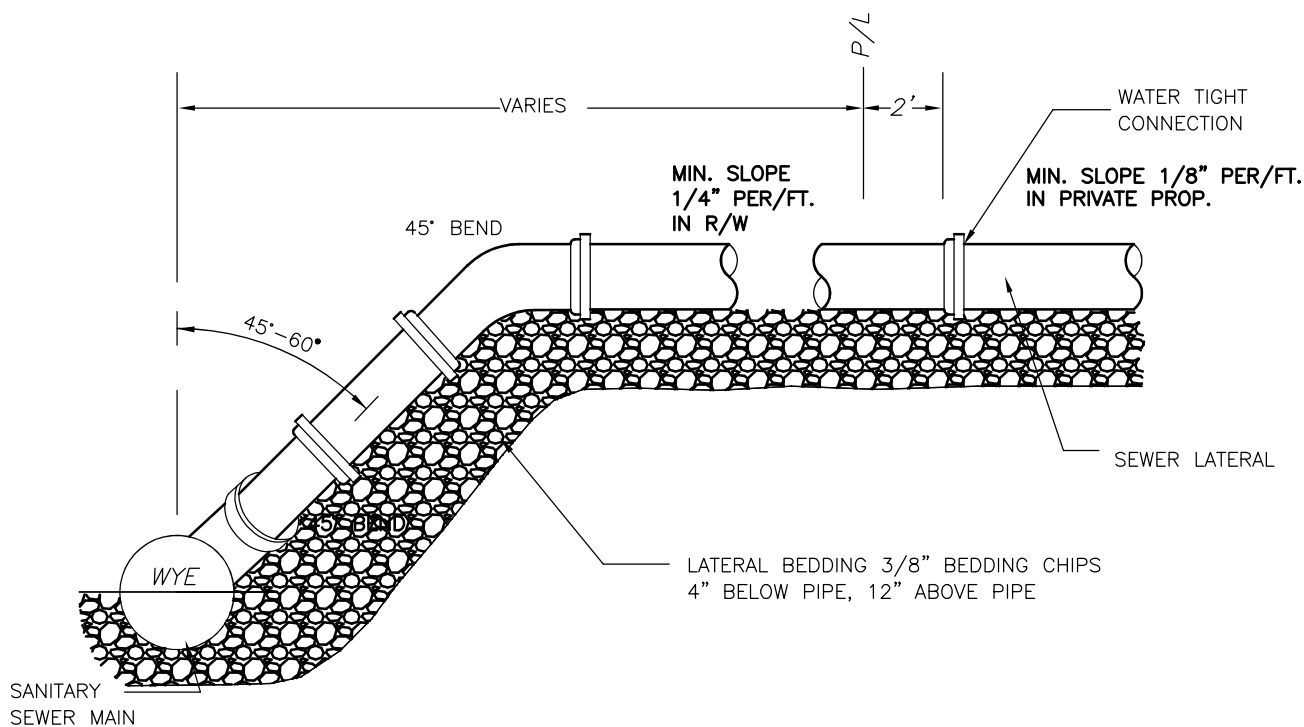
SANITARY MANHOLE CHIMNEY
ASSEMBLY DETAIL IN TURF-2

REVISED: SEPTEMBER 3, 2019 RCB

NOT TO SCALE



SANITARY SEWER LATERAL

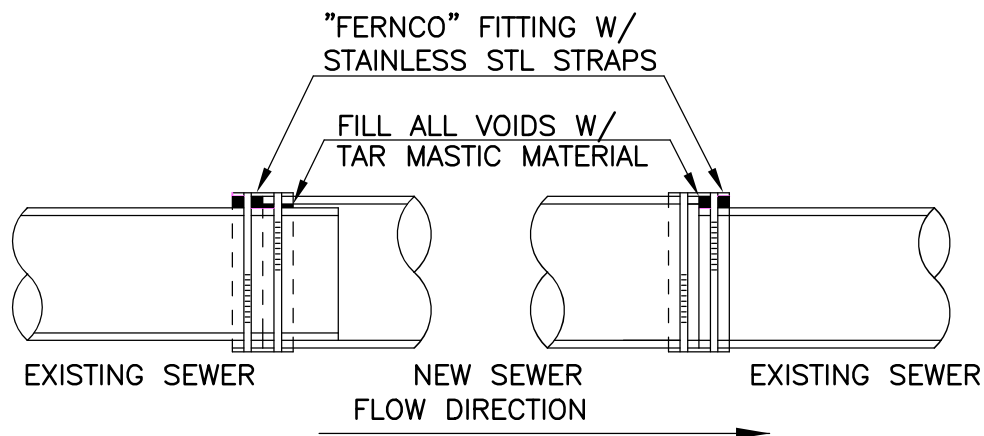


SANITARY SEWER "RISER" LATERAL

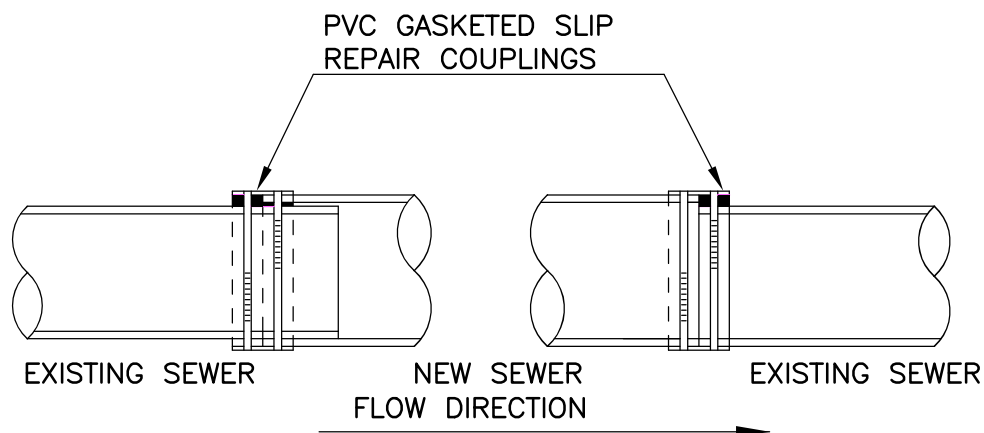
NOT TO SCALE



STANDARD DETAIL
SANITARY SEWER LATERAL



6 CLAY SANITARY SEWER RECONNECTION
1.0 NOT TO SCALE

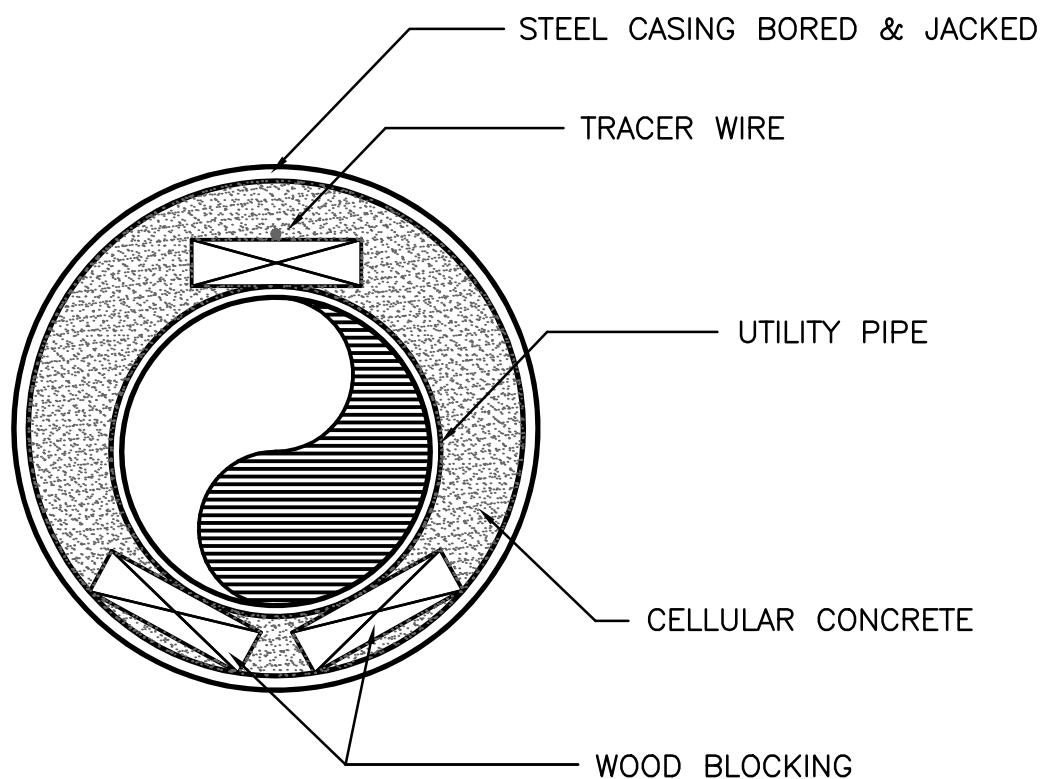


7 SANITARY SEWER RECONNECTION
1.0 NOT TO SCALE

NOT TO SCALE



STANDARD DETAIL SANITARY SEWER RECONNECTION



STEEL CASING PIPE SHALL MEET THE REQUIREMENTS AS DESCRIBED IN THE STANDARD SPECIFICATIONS FOR SEWER AND WATER CONSTRUCTION IN WISCONSIN SECTION 6.2.3 AND DRAWING FILE NO. 49.

THE PIPE SHALL BE SUPPORTED AND BRACED WITH 2" x 6" x 12" GREEN WOOD BLOCKING AND STRAPPED WITH STAINLESS STEEL BANDS AT 5' INTERVALS.

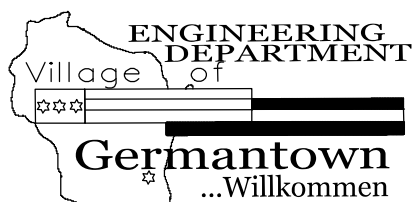
A TRACER WIRE SHALL BE INSTALLED AS PER THE CONTRACT SPECIFICATIONS.

PRIOR TO FILLING THE CASING VOID, EACH END OF THE CASING SHALL RECEIVE A 12" CONCRETE OR BRICK MORTARED BULKHEAD. FILLING TUBES OR VENTS CAN BE INSTALLED INTO THIS BULKHEAD.

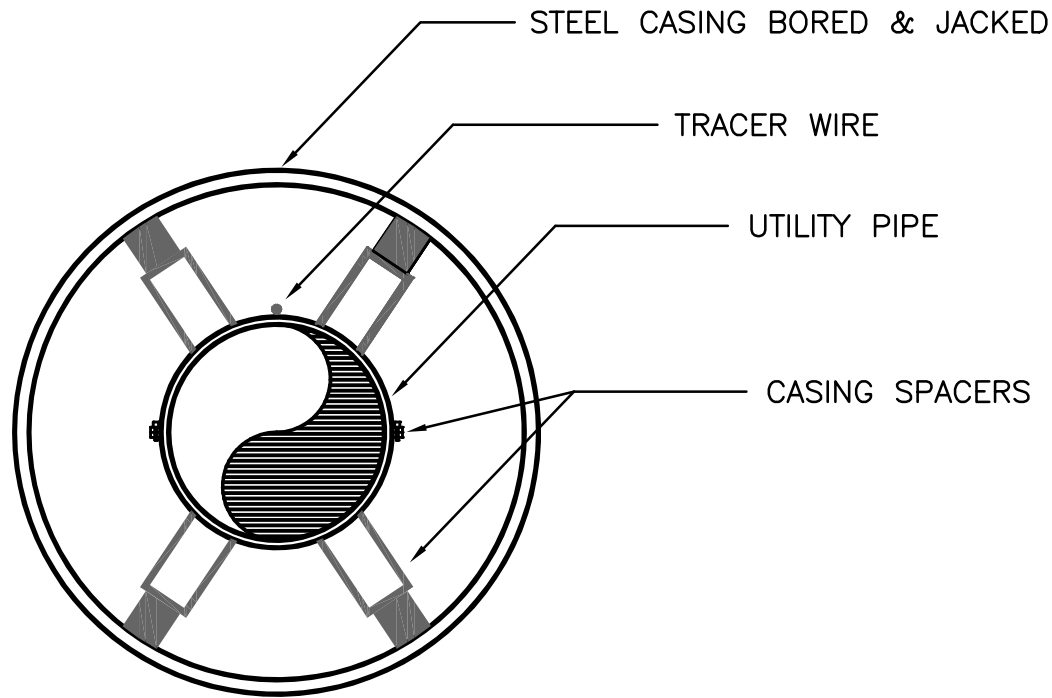
THE ANNULAR SPACE BETWEEN THE UTILITY PIPE AND THE CASING PIPE SHALL BE FILLED WITH A CELLULAR CONCRETE OR OTHER FLOWABLE FILL CONFORMING TO THE REQUIREMENTS OF SECTIONS 8.35.4 AND 8.35.5. AFTER FILLING, VENT PIPES SHALL BE CUT, AT THE CASING, AND PERMENTLY CAPPED WITH A CONCRETE PLUG.

WHEN CASING PIPE IS USED FOR SANITARY OR STORM SEWER PIPE, THE CASING SHALL BE FILLED AND ANY REMAINING TRENCHES BACKFILLED, PRIOR TO TESTING THE SEWER PIPE FOR PRESSURE, LINE AND GRADE BY TELEVISION.

REV. 10/10/2018 RCB



BORING OR JACKING CASING PIPE WITH FLOWABLE FILL



STEEL CASING PIPE SHALL MEET THE REQUIREMENTS AS DESCRIBED IN THE STANDARD SPECIFICATIONS FOR SEWER AND WATER CONSTRUCTION IN WISCONSIN SECTION 6.2.3 AND DRAWING FILE NO. 49.

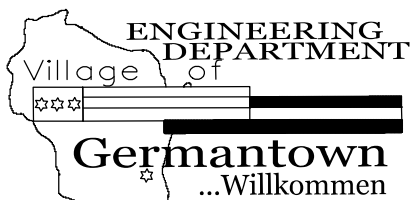
THE PIPE SHALL BE SUPPORTED AND BRACED USING CASING SPACERS AS MANUFACTURED BY ADVANCE PRODUCTS & SYSTEMS OR EQUAL, AS APPROVED BY THE ENGINEER.

A TRACER WIRE SHALL BE INSTALLED AS PER THE VILLAGE SPECIFICATIONS.

EACH END OF THE CASING SHALL RECEIVE A 12" CONCRETE OR BRICK MORTARED BULKHEAD.

NEW UTILITY PIPE TO BE CENTERED IN THE CASING PIPE.

REV. 10/10/2018 RCB



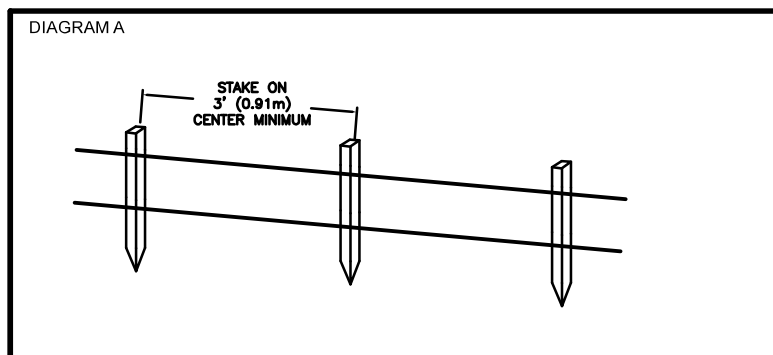
BORING OR JACKING CASING PIPE WITH CASING SPACERS



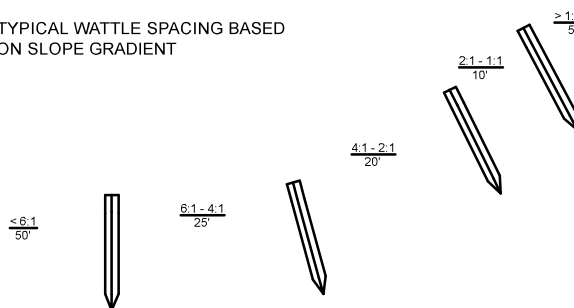
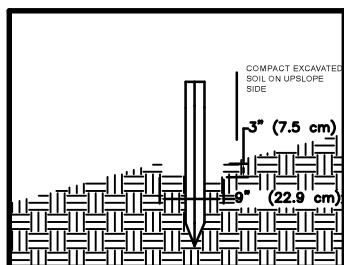
STRAW WATTLE INSTALLATION GUIDE

③

DIAGRAM A



TYPICAL WATTLE SPACING BASED ON SLOPE GRADIENT



1. BEGIN AT THE LOCATION WHERE THE WATTLE IS TO BE INSTALLED BY EXCAVATING A 2-3" (5-7.5 CM) DEEP X 9" (22.9 CM) WIDE TRENCH ALONG THE CONTOUR OF THE SLOPE. EXCAVATED SOIL SHOULD BE PLACED UPSLOPE FROM THE ANCHOR TRENCH.
1. PLACE THE WATTLE IN THE TRENCH SO THAT IT CONTOURS TO THE SOIL SURFACE. COMPACT SOIL FROM THE EXCAVATED TRENCH AGAINST THE WATTLE ON THE UPHILL SIDE. ADJACENT WATTLES SHOULD TIGHTLY ABUT.
3. SECURE THE WATTLE WITH 18-24" (45.7-61 CM) STAKES EVERY 3-4' (0.9 -1.2 M) AND WITH A STAKE ON EACH END. STAKES SHOULD BE DRIVEN THROUGH THE MIDDLE OF THE WATTLE LEAVING AT LEAST 2-3" (5-7.5 CM) OF STAKE EXTENDING ABOVE THE WATTLE. STAKES SHOULD BE DRIVEN PERPENDICULAR TO THE SLOPE FACE.

North American Green Straw Wattles are a Best Management Practice (BMP) that offers an effective and economical alternative to silt fence and straw bales for sediment control and storm water runoff.

Guidelines are provided to assist in design, installation, and structure spacing. The guidelines may require modification due to variation in soil type, rainfall intensity or duration, and amount of runoff affecting the application site.

To maximize sediment containment with the Straw Wattle, place the initial structure at the top/crest of the slope if significant runoff is expected from above. If no runoff from above is expected, the initial Straw Wattle can be installed at the appropriate distance downhill from the top/crest of the slope. The final structure should be installed at or just beyond the bottom/toe of the slope. Wattles should be installed perpendicular to the primary direction of overland flow.

Straw Wattles are a temporary sediment control device and are not intended to replace rolled erosion control products (RECPs) or hydraulic erosion control products (HECPs). If vegetation is desired for permanent erosion control, North American Green recommends that RECPs or HECPs be used to provide effective immediate erosion control until vegetation is established. Straw Wattles may be used in conjunction with blankets, mats, and mulches as supplemental sediment and runoff control for these applications. Like all sediment control devices, the effectiveness of the Straw Wattle is dependent on storage capacity.

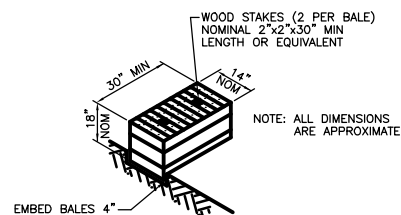
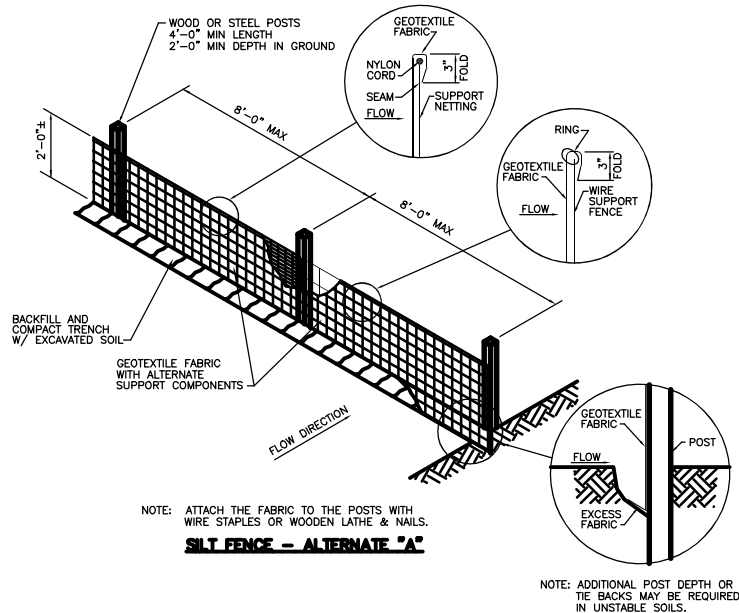
14649 HIGHWAY 41 NORTH, EVANSVILLE, INDIANA 47725
1-800-772-2040 TOLL FREE 812-867-6632
www.nagreen.com

NOT TO SCALE



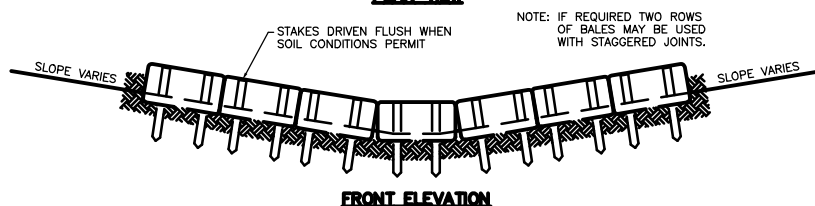
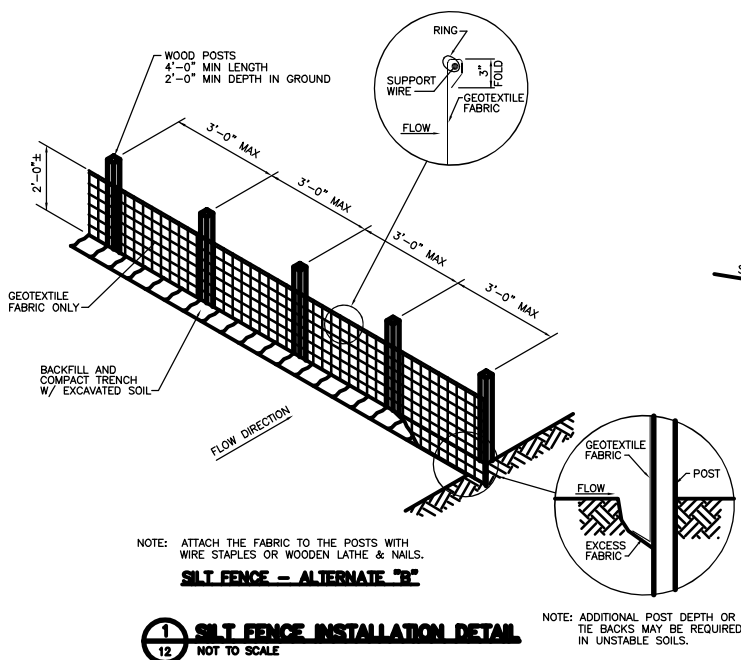
STANDARD DETAIL WATTLE INSTALLATION

REVISED SEPTEMBER 3, 2019 RCB



- NOTES:
1. BALES SHALL BE PLACED WITH TWINE OR TIE WIRES PARALLEL TO THE GROUND.
 2. STAKES TO BE BATTERED IN OPPOSITE DIRECTIONS.

2 EROSION BALES INSTALLATION DETAIL
12 NOT TO SCALE



- NOTES:
1. BALES SHALL BE PLACED END TO END OR OVERLAPPING AT RIGHT ANGLES TO THE DIRECTION OF FLOW AND FAR ENOUGH UP THE SIDES OF THE DITCH TO PREVENT ERODING AROUND ENDS.

3 EROSION BALES ACROSS DITCH BOTTOM DETAIL
12 NOT TO SCALE

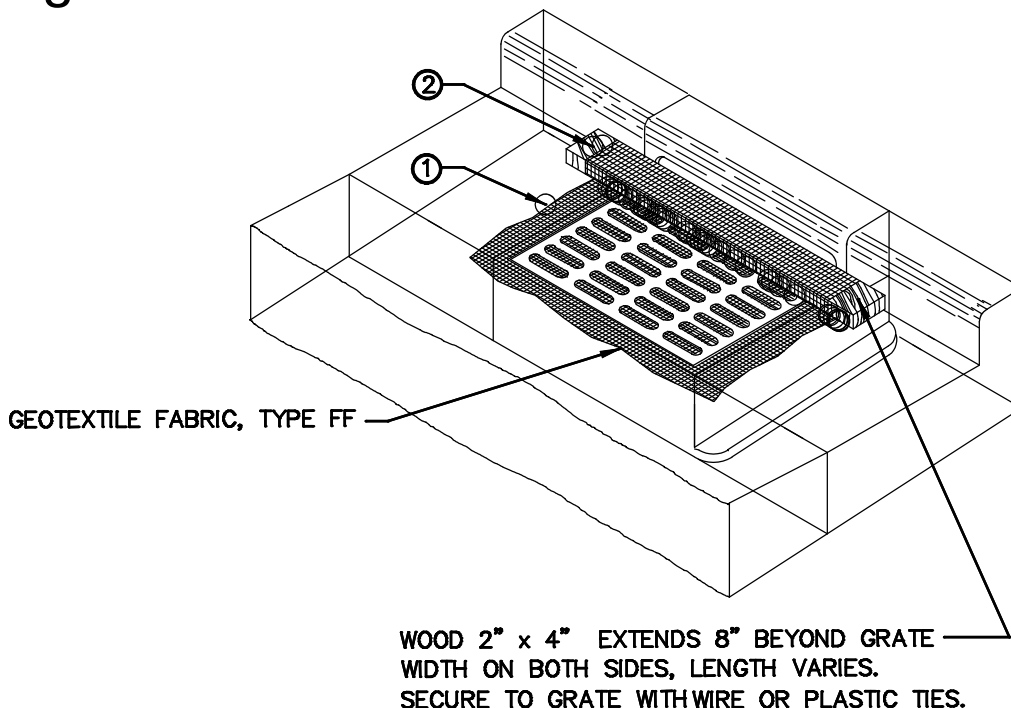
1 SILT FENCE INSTALLATION DETAIL
12 NOT TO SCALE

NOT TO SCALE



STANDARD DETAIL EROSION CONTROL MEASURES

APPROVED 2/2006 REVISED: 09/4/2019 RCB



INSTALLATION NOTES

TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.

THE CONTRACTOR SHALL DEMONSTRATE A METHOD OF MAINTENANCE, USING A SEWN FLAP, HAND HOLDS OR OTHER METHOD TO PREVENT ACCUMULATED SEDIMENT FROM ENTERING THE INLET.

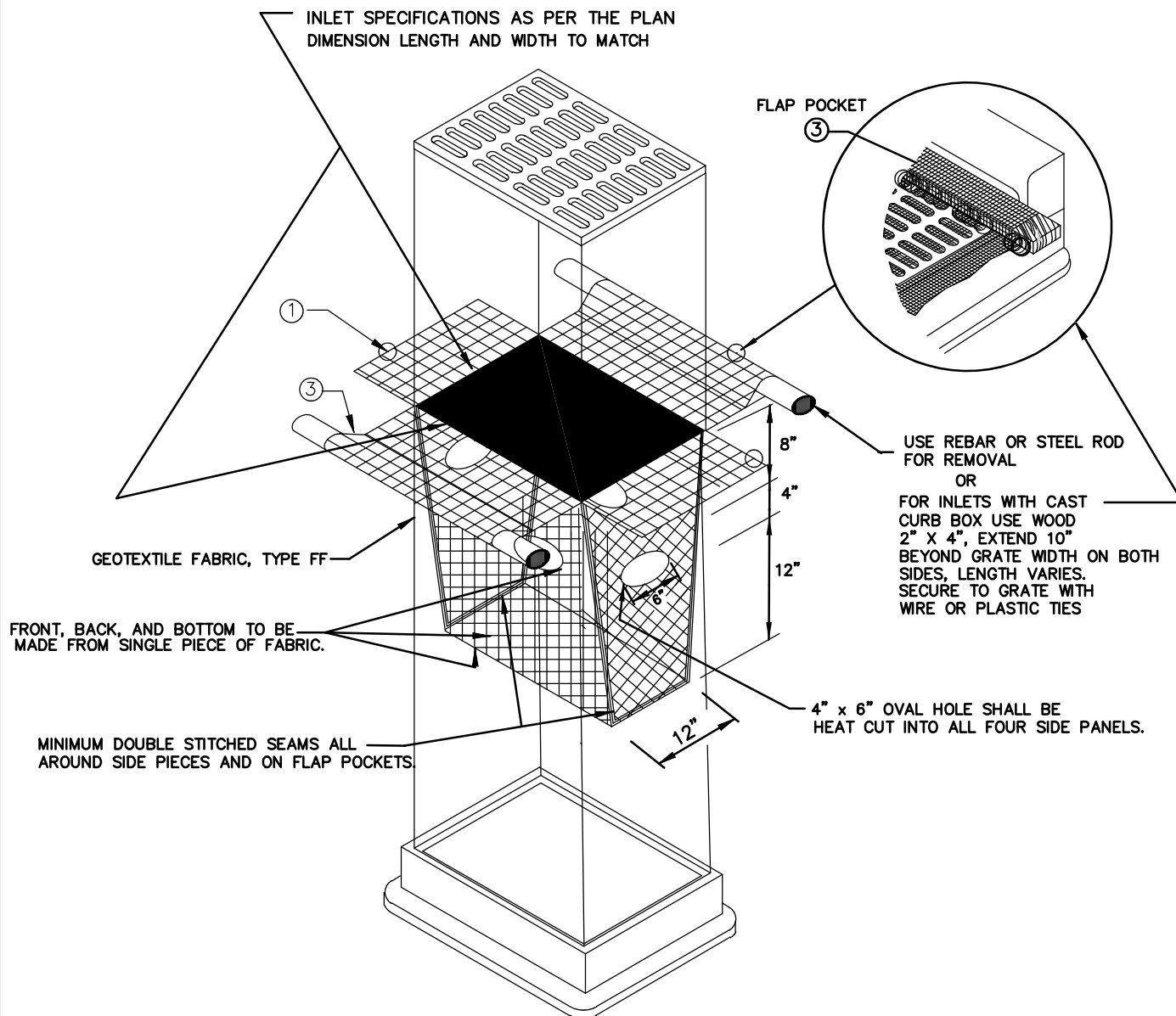
GENERAL NOTES

INLET PROTECTION DEVICES SHALL BE MAINTAINED OR REPLACED AT THE DIRECTION OF THE ENGINEER.

MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE DEPARTMENT'S EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED.

WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL INTO THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.

- ① FINISHED SIZE, INCLUDING FLAP POCKETS WHERE REQUIRED, SHALL EXTEND A MINIMUM OF 10" AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.
- ② FOR INLET PROTECTION, TYPE C (WITH CURB BOX), AN ADDITIONAL 18" OF FABRIC IS WRAPPED AROUND THE WOOD AND SECURED WITH STAPLES. THE WOOD SHALL NOT BLOCK THE ENTIRE HEIGHT OF THE CURB BOX OPENING.
- ③ FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2" x 4".



INSTALLATION NOTES

DO NOT INSTALL INLET PROTECTION TYPE D IN INLETS SHALLOWER THAN 30", MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE.

TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.

THE INSTALLED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE, BETWEEN THE INLET WALLS AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES, OF 3". WHERE NECESSARY THE CONTRACTOR SHALL CINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3" CLEARANCE. THE TIES SHALL BE PLACED AT A MAXIMUM OF 4" FROM THE BOTTOM OF THE BAG.

GENERAL NOTES

INLET PROTECTION DEVICES SHALL BE MAINTAINED OR REPLACED AT THE DIRECTION OF THE ENGINEER.

MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE DEPARTMENT'S EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED.

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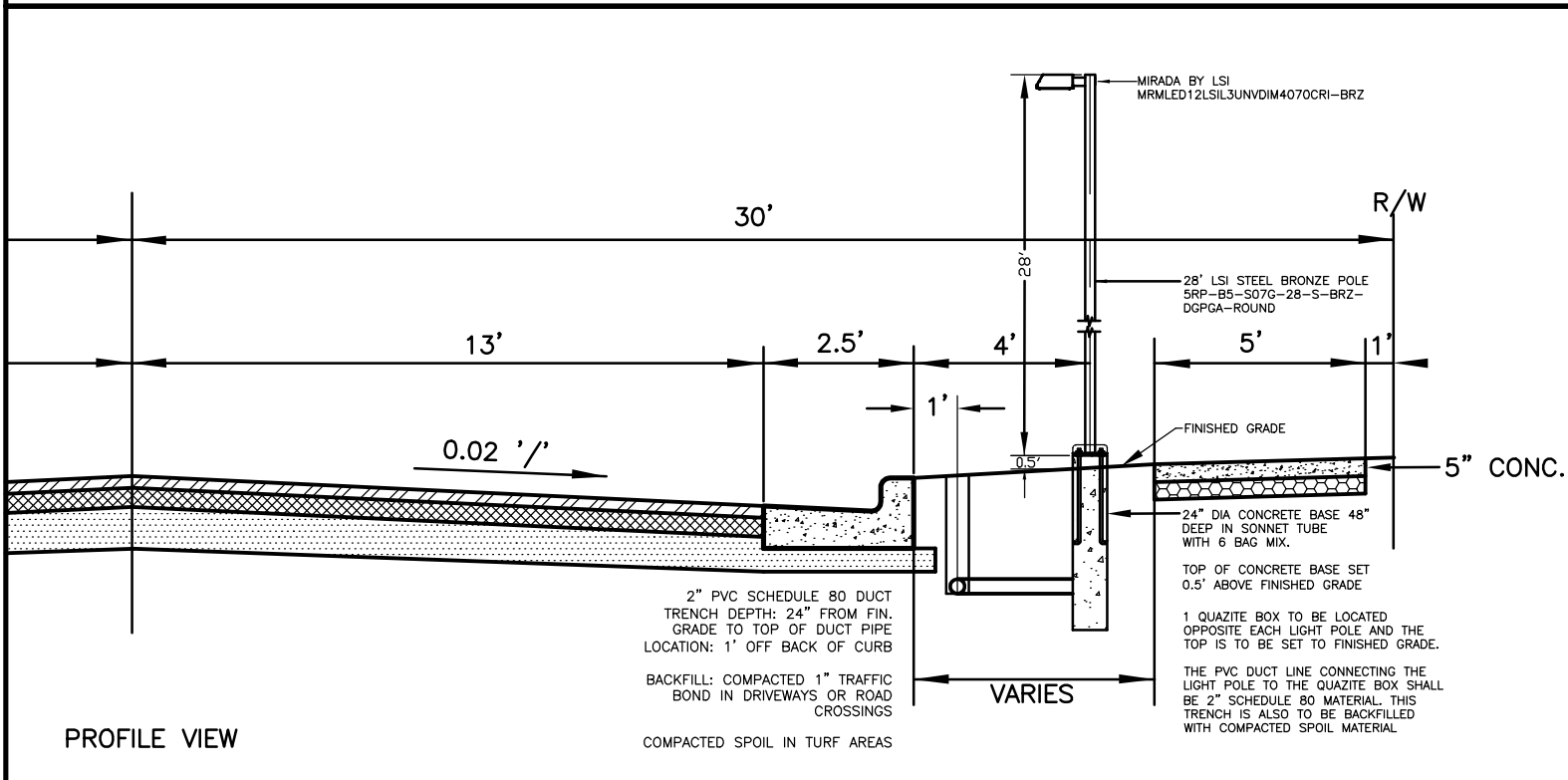
③ FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2" x 4".

REV. 8/30/2019 RCB



INLET PROTECTION, TYPE D

(CAN BE INSTALLED IN ANY INLET TYPE WITH OR WITHOUT A CURB BOX AS PER NOTE ②)



ENGINEERING
DEPARTMENT
Village of [REDACTED]
[REDACTED]
[REDACTED]
Germanstown
...Willkommen

PUBLIC OWNED LIGHT
URBAN TYPE ROADWAY

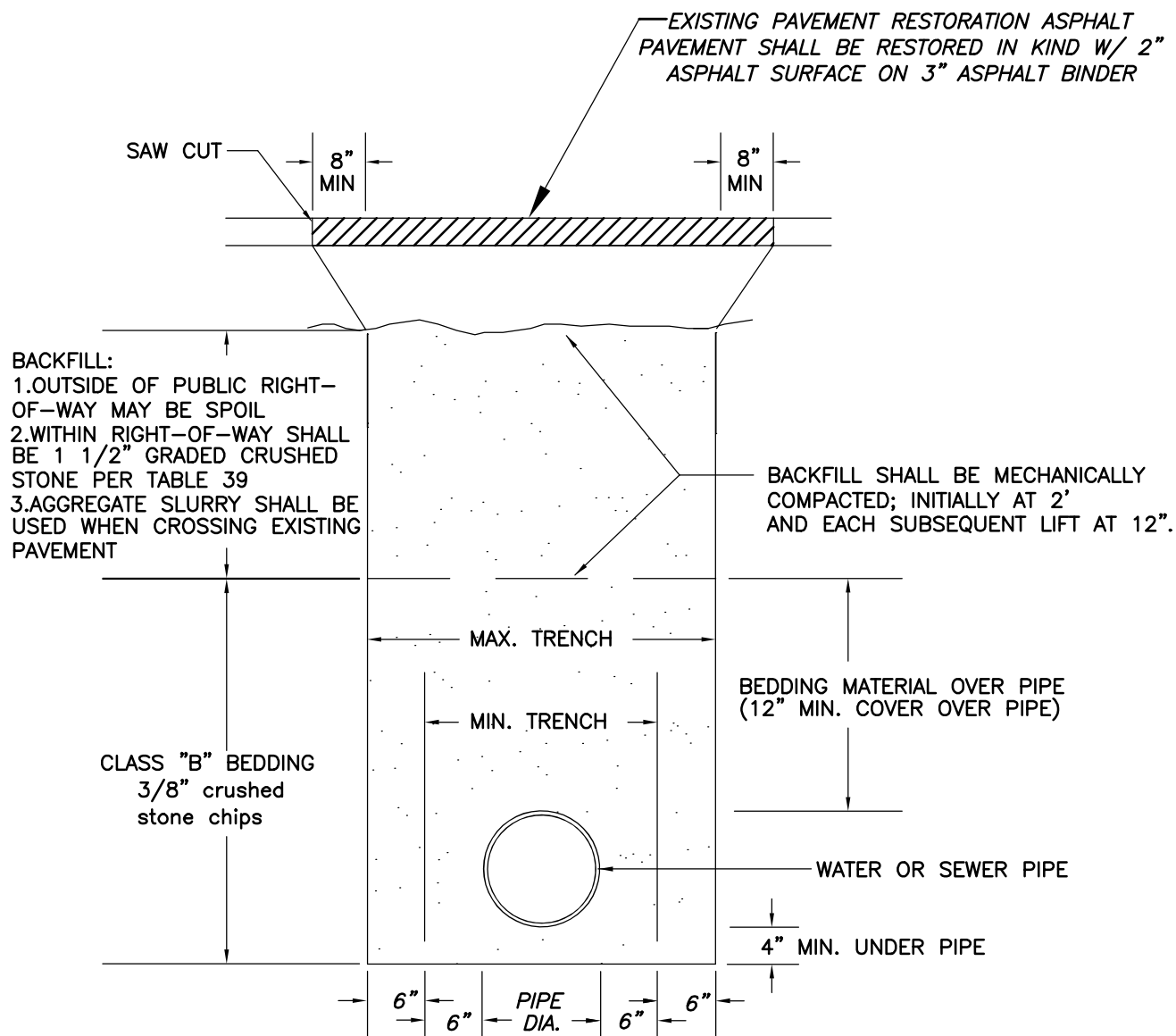
NOT TO SCALE
Page 305 of 317



NO ADDITIONAL WATER WILL BE ALLOWED. THE ABOVE WEIGHTS ARE DAMP WEIGHTS. JUST PRIOR TO PLACING THE SLURRY BACKFILL, THE MIXER SHALL BE RUN AT MIXING SPEED FOR ONE FULL MINUTE TO ASSURE AN EVEN MIXTURE.



NOT TO SCALE

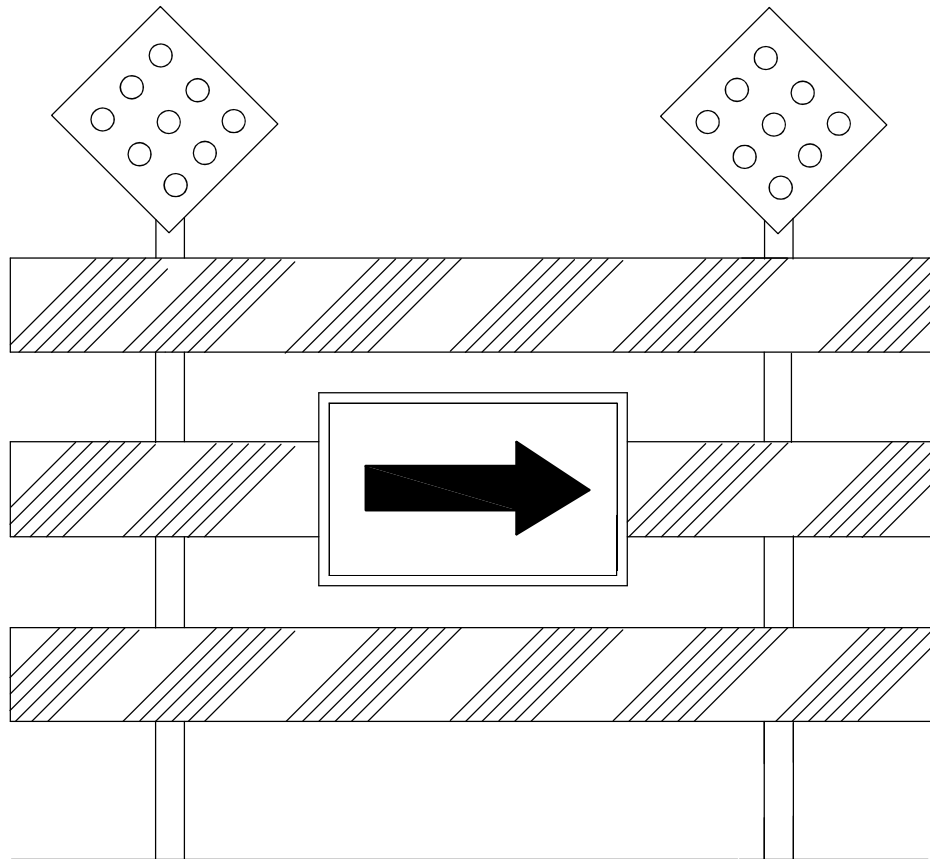


DATE: 8/30/2019 RCB



STANDARD WATER MAIN AND SANITARY SEWER TRENCH DETAIL

R11-2



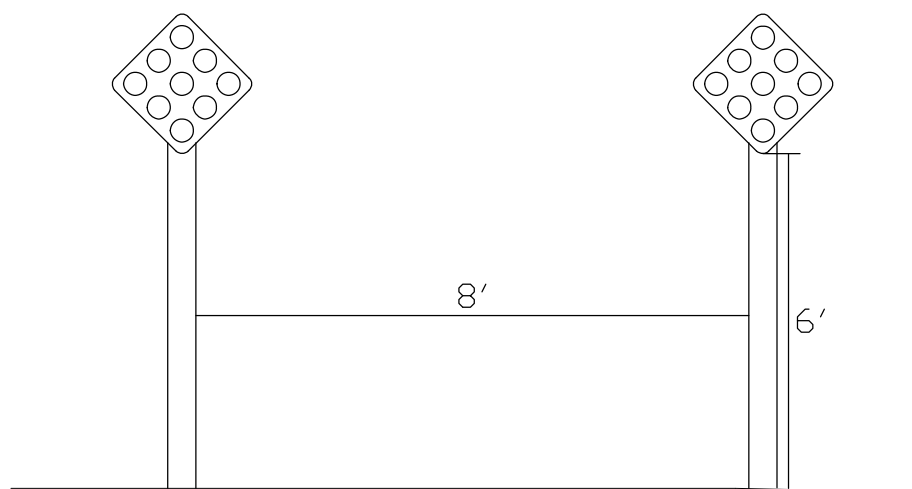
1 TO 3 RAILS-MINIMUM LENGTH OF 48 INCHES (1200mm)

STRIPE- ALTERNATING RED AND WHITE
RETROREFLECTIVE STRIPES SLOPING DOWNWARD
AT AN ANGLE OF 45 DEGREES.
ALL STRIPES SHALL BE 6 INCHES (150 mm) WIDE.

NOT TO SCALE



STANDARD DETAIL
TYPE III BARRICADE
PERMANENT INSTALLATION



TWO U-CHANNEL POSTS INSTALLED WITH 8' SPACING

TWO OM4-2 SIGNS INSTALLED 6' ± 3" ABOVE SURFACE TO
BOTTOM OF SIGN

OM4-2 SIGN: 18" x 18" x .08, BLACK VINYL, 9 REFLECTIVE
RED CIRCLES.

REFLECTIVE RED CIRCLES MUST BE HIGH INTENSITY
PRISMATIC REFLECTIVE SHEETING.
NO PLASTIC CAPPED REFLECTOR BUTTONS.

NOT TO SCALE



STANDARD DETAIL END OF ROAD

BUSINESS OF THE PUBLIC WORKS & HIGHWAYS COMMITTEE

MEETING DATE: August 14, 2024

PLACEMENT: Presentation

ITEM TITLE: Department of Public Works 5 Year Strategy

SUBMITTED BY: Matthew Mortwedt, Public Works Director

SUMMARY EXPLANATION:

Presentation on the 5-year strategy for the Department of Public Works.

ATTACHMENT:

1. DPW Mission Values
2. DPW 5 Year Plan

STAFF RECOMMENDATION:

Advance to the department 5 year strategy to the Village Board with a positive recommendation for approval.

ACTION BY Committee:

Department of Public Works Mission Statement

The Village of Germantown Department of Public Works enhances the quality of life, health and safety of all citizens by providing top quality services through a very responsive and responsible team committed to high ethical standards, accountability and effective maintenance of the Village's infrastructure (highways, water infrastructure, sewer infrastructure, facilities, and parks).

Our Values

High Ethical Standards

Service

Teamwork

Highly Responsive

Good Stewardship of Village Assets

Data-Driven Decision Making

Safety



Department of Public Works

Matt Mortwedt, Director

Kevin Driscoll, Village Engineer

N112W17001 Mequon Rd, PO Box 53022

engineering@germantownwi.gov

262-253-4721

	2024							2025												2026														
	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	2027	2028	2029
Inventory, Condition Assessment & Planning																																		
Stormwater Infrastructure																																		
6-20 Foot Storm Structures																																		
Fleet Equipment																																		
PASER																																		
Sidewalks																																		
Streets - Signs, Lights, Traffic Signals, etc.																																		
Graef Facilities Plan - Update																																		
Technology																																		
WO and Asset Management																																		
Identify Solution																																		
Implementation																																		
PM Programming																																		
CRM/311																																		
Identify Solution																																		
Implementation																																		
Telematics																																		
Identify Solution																																		
Install																																		
GIS Upgrade																																		
Identify Solution																																		
Implementation																																		
Optimize																																		
GIS Roads Layer																																		
GIS Traffic Signals and Street Lights																																		
Public Works Website Updates																																		
Training																																		
Safety																																		
Emergency Management																																		
Leadership																																		
Equipment Training																																		
Plan Development Update																																		
Tree Plan																																		
Winter Maintenance Operations Manual																																		
Fleet Plan																																		
Water Utility Facilities Plan																																		
Stormwater Utility Planning																																		
Debris Management Plan																																		
Policy Development																																		
Working in ROW/Work Zone Safety																																		
Mowing Safety																																		
Lock-out Tag Out																																		
Incident and Accident Investigation																																		
Tool Box Talks																																		
Project Management Process																																		
Development Guide Book																																		
Pavement Cuts, Backfill, and Restoration																																		
Complaint Processing Policy																																		
Permit Processing Policy																																		
Long Range Calendar Development																																		
Initial Development																																		
Ongoing Development																																		
Working Groups																																		
10 Year Equipment WG																																		
Safety WG																																		
Engineering File Structure WG																																		
GIS WG																																		
Staffing/Organization																																		
Engineering - CE																																		
Asset Manager																																		

Director's Report - August 2024

Staff Top 3 Projects

Village Engineer

1	Donges Bay Road Reconstruction	Completion anticipated in early September.
2	Glenwood Park Water Main Relays	Construction began the week of 8/5.
3	Division Rd Concepts and Community Engagement	Awaiting final report for presentation to PWHC and VB.

Engineering Tech

1	2024 Road Program	Wolf Paving anticipates an August start.
2	2024 Sealcoating Program	Chipseal complete, Microsurface and GSB 88 in later August.
3	2024 Wasterwater CIPP Specification	Specification to be developed for fall bid.

Water Superintendant

1	Goldendale Booster	Anticipated start up in August.
2	Well 12 Construction / Well 12 Rehab	Presentation to VB on Well 12 testing and solution. Well house construction to resume.
3	Tower 4 Construction	Tower 4 raised and welded. Painting and internal work scheduled.

Wastewater Superintendant

1	Ruekert and Mielke Facilities Study and amendment	To be presented to UAC on 8/15.
2	DPW Move	Major move starting 8/19.
3	2024 Cured in Place Sewer Lining	Anticipate fall bid and coordination with Engineering Division.

Highway, Parks , Buildings & Grounds Superintendant

1	DPW Move	Major move starting 8/19.
2	Manhole and cluvert repairs.	Repair of two stormwater culverts and a manhole.
3	Catch Basin Re-Builds.	In progress.

Director's Report - August 2024, cont.

Director

1	Comprehensive Tree Plan	Adoption at PWHC on 8/14.
2	Public Safety Building Needs Assessment and Feasibility Study RFP	Working into the second phase. Major update meeting planned for 8/20.
3	DPW Move	Coordinating primary and back-up internet service, printer leases,
4	Budget Prep	Coordinating budget between the DPW divisions.

Richfield IGA Update

Richfield is proceeding with acquisition of the right of way and easements necessary then pausing the project until developmnet advances.

Work By Other Agencies

WISDOT - Lannon & Maple Intersection - In Progress
WE Energies - Various Locations - 2024
ANR Pipeline - Reline through Village - Spring/Summer 2025
WISDOT - 145 & Division Rd Roundabout - Summer 2026
WISDOT - 145 Resurfacing from Mequon Rd to Brown Deer Rd - 2028
WISDOT - Resurfacing Mequon Rd from Division to Pilgrim - 2028
WISDOT - US 167/Lannon/Mequon- 1-41 to US 145 - 2028

Compliance Milestones

1	PSC CPR Report Development - Hired R-M to assist with CPR Development.
2	DNR Storm Water Polution Prevention Plan (SWPPP) - overdue
3	MS4 Permit Application - 9/24 - Hired GRAEF to assist with application development.

Department Update

1	Anticipating hires for Mechanic and Water Utility Operator
2	Anticipate a policy for CDL compensation for new hires at the next GGF
3	DPW Policy Development: Pavement Cuts, Backfill and Restoration, Permit Processing Policy
4	Impact Fee Study led by Village Administrator
5	DPW move has begun. Major move effort will begin 8/19. Anticipate operating out of the facility in early September.
6	Tentative: DPW Ribbon Cutting 5:30 PM on 9/17; DPW Open House 10/26
7	Road program to begin in August.
8	Maple Rd reconstruction - Traffic control late Aug, construction in August.
9	Goldendale Booster start up anticiapted in July
10	Water Rate Step II Increase and Sewer Rate Increase to be announced in Utility Bill flyer.

Complaint Log - 7/1 - 7/31

Engineering - Drainage	1
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Engineering - Misc.	1
Garbage - General Complaint	1
Garbage - Missed Garbage	1
Water - Miscellaneous	1
Street -Miscellaneous	5
Street - Pothole	2
Street - Street Light Out	1
Water - Meter	1
Total	14

7/1/2024	Tom Kranick
7/8/2024	Dave Skrober
7/9/2024	Mary Schultz
7/10/2024	Melaine Smythe
7/11/2024	James Scheppe
7/15/2024	Diane Jellison
7/24/2024	Craig Ostovich
7/29/2024	Lynn Mohr
7/29/2024	

W190N11350 Carnegie Drive	414-671-1255	Engineering - Drainage	1
N136W21815 Bonnie Well Road	414-732-5803	Engineering - Misc.	1
W140N10337 Fond du Lac Avenue	920-207-2275	Garbage - General Complaint	1
	262-247-6301	Garbage - Missed Garbage	1
W156N10531 Jefferfson Lane	414-702-5466	Water - Miscellaneous	1
N98W15826 School Road	262-844-0572	Street -Miscellaneous	5
W168N12340 Century Lane	414-380-9163	Street - Pothole	2
N100W16922 Revere Lane	262-305-5583	Street - Street Light Out	1
Pilgrim and Starlight		Water - Meter	1
Total			14