

Appendix C Regional Storm Water Ponding Needs

Background

Surface water or storm water management systems were evaluated as part of the comprehensive planning process. The Shell Rock River Watershed District Water Management Plan (2004), Shell Rock River Watershed District Rules (2007) and City of Albert Lea Storm Water Pollution Prevention Program (SWPPP) (2007) were consulted in this evaluation and investigation. It is the intent of the Comprehensive Plan to follow the rules and policies outlined in these key foundation planning documents.

Methodology and Assumptions

This Appendix investigates what sort of land area should be set aside for regional storm water pond facilities in Albert Lea. The MPCA (Minnesota Pollution Control Agency) allows the use of various methods to manage storm water runoff as part of their NPDES/SDS permitting, including wet sedimentation basins (NURP), infiltration/filtration, regional ponds (wetlands, etc.), and alternative methods. The wet sedimentation basin is typically the worst case scenario for land consumption and therefore was used in this investigation.

There are many different variables that can influence the land required for a wet sedimentation basin beyond land use types or impervious areas. A wet sedimentation basin has a permanent storage volume and a temporary volume with a bench in between. Pond sizing was evaluated with a number of different land use runoff coefficients and watershed areas, the results of which found that there wasn't much difference keeping the watershed area constant and changing the land use runoff coefficients. The culprit behind this is the MPCA requirement of a minimum permanent storage of 1,800 cu ft per watershed acre. This volume translates to ½ inch of storm water runoff over the entire acre. MPCA requires treating ½ inch of storm water runoff for all new impervious areas, so the 1,800 cu ft per acre requirement is basically assuming 100% impervious in the watershed.

The temporary storage handles the storm events above and beyond the ½ inch runoff (~1/2 year storm event). Typically these events (up to the 100 year event) are handled with the basin configuration required for 1,800 cu ft per acre in the watershed, with the “bounce” in water level within the maximum 6 foot temporary storage zone (2-4 feet typically). However, detailed hydrology and pond routing can influence these results significantly, but the land area required does not change significantly due to the permanent storage requirement. A foot or 2 of freeboard is above the high water mark, and a minimum 8 foot wide access on top of the basin and space needed for transitioning to existing grades (backslopes) make up the remainder of the space requirements. The larger the pond and more steep terrain, the more space required for elevation transition.

We found that the percentage of total watershed area needed for storm water management facilities was generally between 2% and 10% of the total watershed. If the City implements on-site treatment for all development, then no storm water management is needed (theoretically). If the City were to provide all storm water management, then 10% is a conservative number.

Results/Conclusion

This investigation suggests splitting the difference and using 5% of land area within a watershed for regional storm water ponding needs - that way the City has ample amount of land with the on-site treatment requirement. This standard can be applied to the sub-watershed district level. This standard should be frequently evaluated as it is subject to change based on government regulation or innovative technologies.

Our assumptions for growth/development capacity factor in this 5% of land area by assuming a slightly lesser density or floor area ratio (i.e. for future retail growth in an Interstate District we used and FAR of 0.20, when the typical coverage may be closer to 0.25). This assumes that there will be minimal to no loss of development due to land area needed for storm water management. Instead storm water management will be incorporated into the site's design and/or density will be transferred as a means of minimizing costs for regional storm water pond needs.

Exhibit A provides a generalized map identifying possible storm sewer sub districts and quantifies developable land area within each sub district. The developable land area is based on the growth areas defined through the comprehensive planning process.

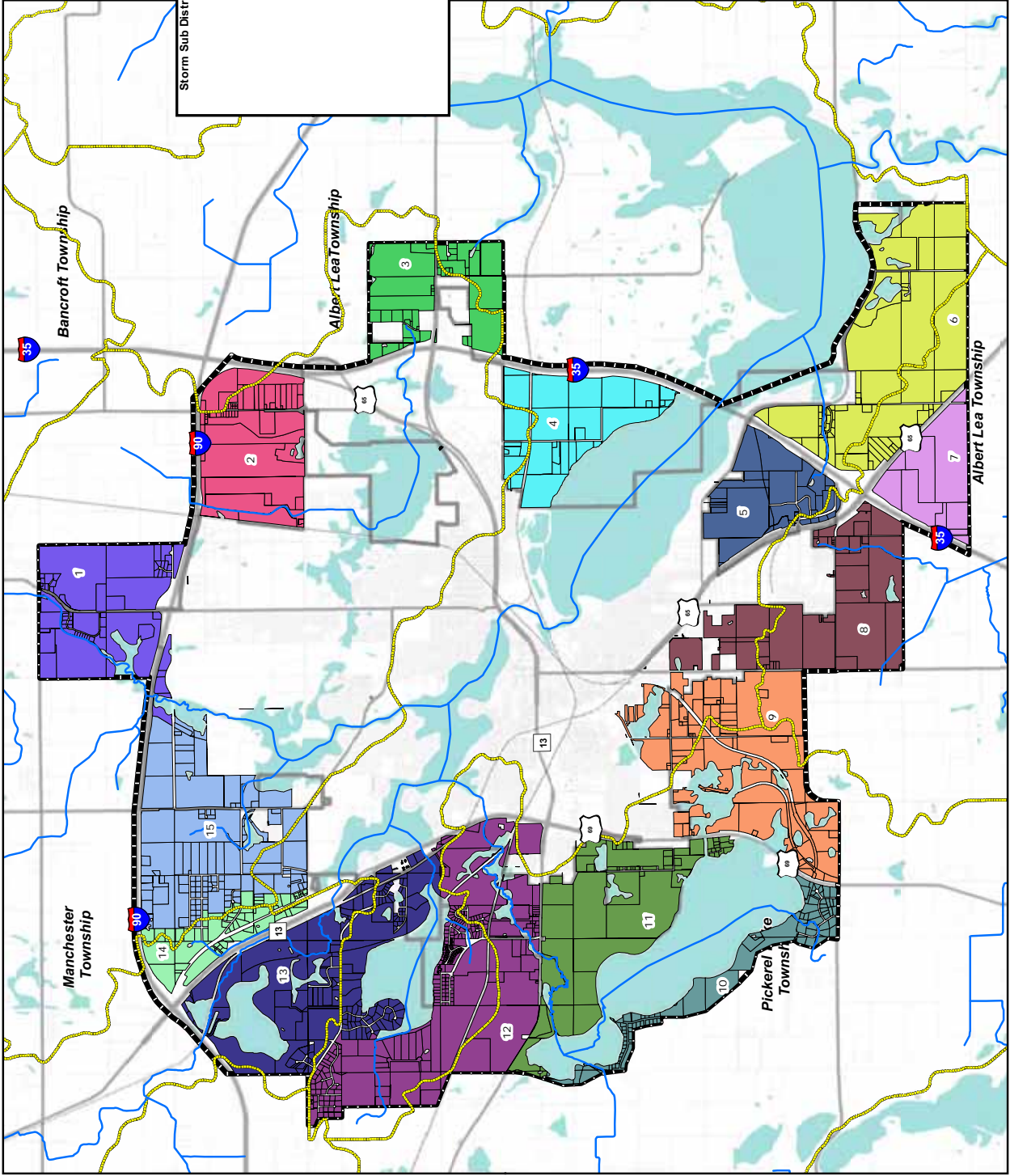
Appendix C -- Exhibit A

Albert Lea Comprehensive Plan

Regional Storm Water Ponding Needs

October 2008

Storm Sub District	Developable Land in District	Acres Needed for Ponding
1	578.44	23.67
2	539.88	22.08
3	375.22	16.23
4	474.16	21.48
5	346.23	14.55
6	962.35	42.48
7	291.4	13.81
8	669.21	31.31
9	783.33	29.14
10	248.79	6.53
11	669.82	26.29
12	1,056.28	39.59
13	770.54	29.44
14	219.3	7.93
15	797.38	27.25



Legend

- Streams Stream
- Shell Rock Watershed (Sub Districts)
- Growth Areas
- Sub District Identifier
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- Growth Boundary
- City Limits (2007)

