RESULTS OF

STORMWATER DESIGN STAKEHOLDER SURVEY CITY OF MANHATTAN, KANSAS

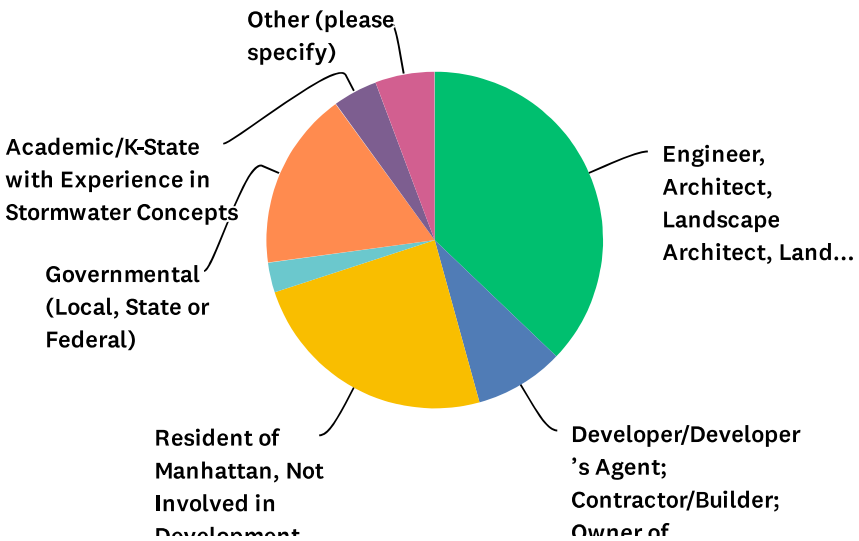
CONDUCTED JUNE 2020

Results Summarized Oct 2020

An opinion survey regarding the existing condition of our Manhattan's Stormwater System and Design Criteria was conducted in June 2020. Interested stakeholders were invited to participate. Outreach included direct email to local engineers, architects and developers; members of the Manhattan Urban Area Planning Board; selected City staff and Public Works professionals from neighboring jurisdictions. Other invitations were issued through the KSPE, the Wildcat Creek Resiliency Task Force, regional conservation organizations, and a general invitation to the interested public through the City's *Insider* e-newsletter. A total of 70 responses were received.

Q1 Which best describes your role in projects in Manhattan, or your perspective on stormwater issues? (Pick one that applies the best)

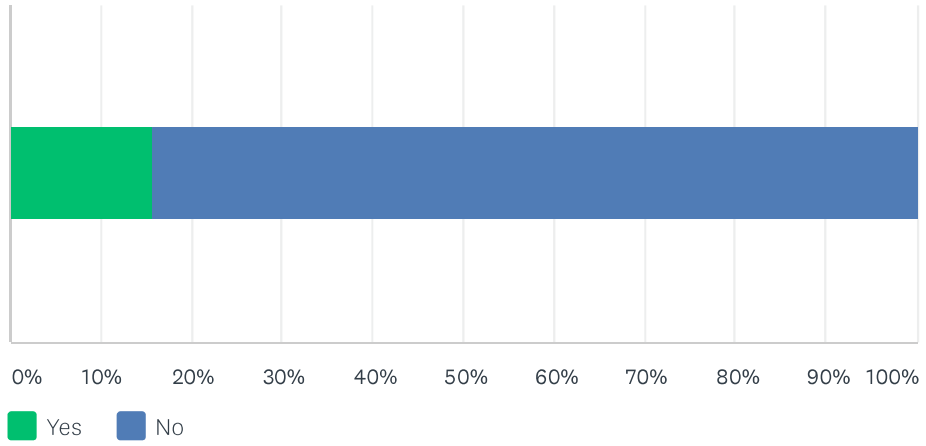
Answered: 70 Skipped: 0



ANSWER CHOICES	RESPONSES	
Engineer, Architect, Landscape Architect, Land Surveyor or Engineering Technician	37.14%	26
Developer/Developer's Agent; Contractor/Builder; Owner of Development Land	8.57%	6
Resident of Manhattan, Not Involved in Development	24.29%	17
Business Owner/Manager in Manhattan	2.86%	2
Governmental (Local, State or Federal)	17.14%	12
Academic/K-State with Experience in Stormwater Concepts	4.29%	3
Other (please specify)	5.71%	4
TOTAL		70

Q2 Are you a City of Manhattan staff member? (Staff are invited to complete the survey, but some responses will be analyzed separately)

Answered: 70 Skipped: 0



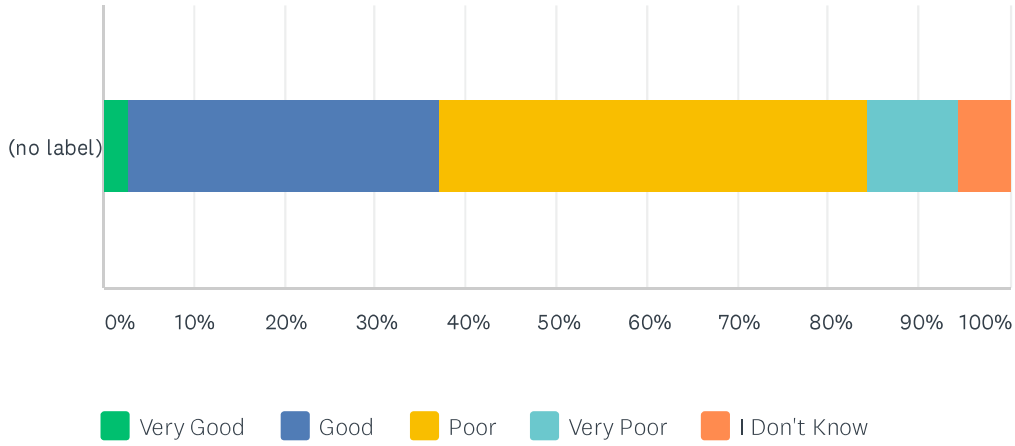
ANSWER CHOICES	RESPONSES	
Yes	15.71%	11
No	84.29%	59
TOTAL		70

ORGANIZATION
MUAPB
Riley County Conservation District
Commercial Real Estate Services
City of manhattan
BG Consultants
Bartlett & West
Bartlett & West, Inc.
City of Manhattan
Retired
Manhattan Urban Planning Boa
City of MHK
Back 9 Development
City of Manhattan, KS
Olsson
Pottawatomie County
KDOT
Schwab Eaton
Sharingbrook Homeowners Association and Stoencreek Family Physicians
Kansas Alliance for Wetlands and Streams (KAWS)
New Boston Creative Group, LLC
self
-
MFD
Bruce McMillan AIA Architects PA
Anderson Bed & Breakfast and Manhattan Urban Area Planning Board
Schwab Eaton
SMH Consultants, P.A.
Schwab Eaton
KSU Campus Planning
Ebert Const
Kansas State University
Alfred Benesch & Company

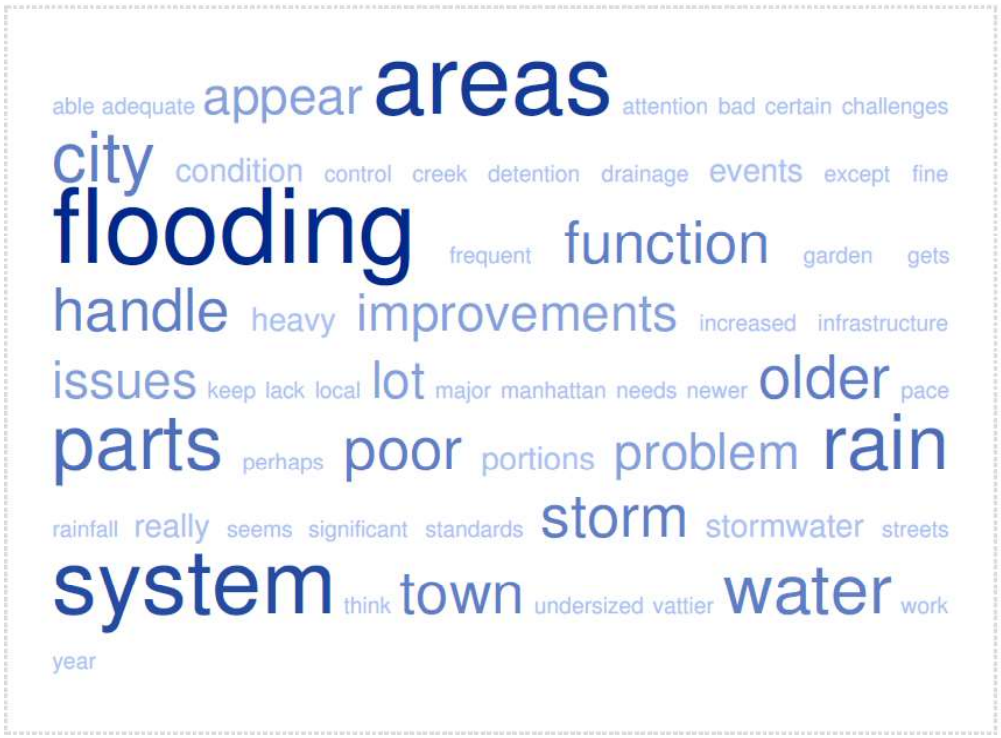
Note: Approximately half of the respondents provided name or organizational information. This information was not required.

Q3 How would you rate the overall function and condition of the stormwater systems in Manhattan?

Answered: 70 Skipped: 0



	VERY GOOD	GOOD	POOR	VERY POOR	I DON'T KNOW	TOTAL	WEIGHTED AVERAGE
(no label)	2.86% 2	34.29% 24	47.14% 33	10.00% 7	5.71% 4	70	2.32

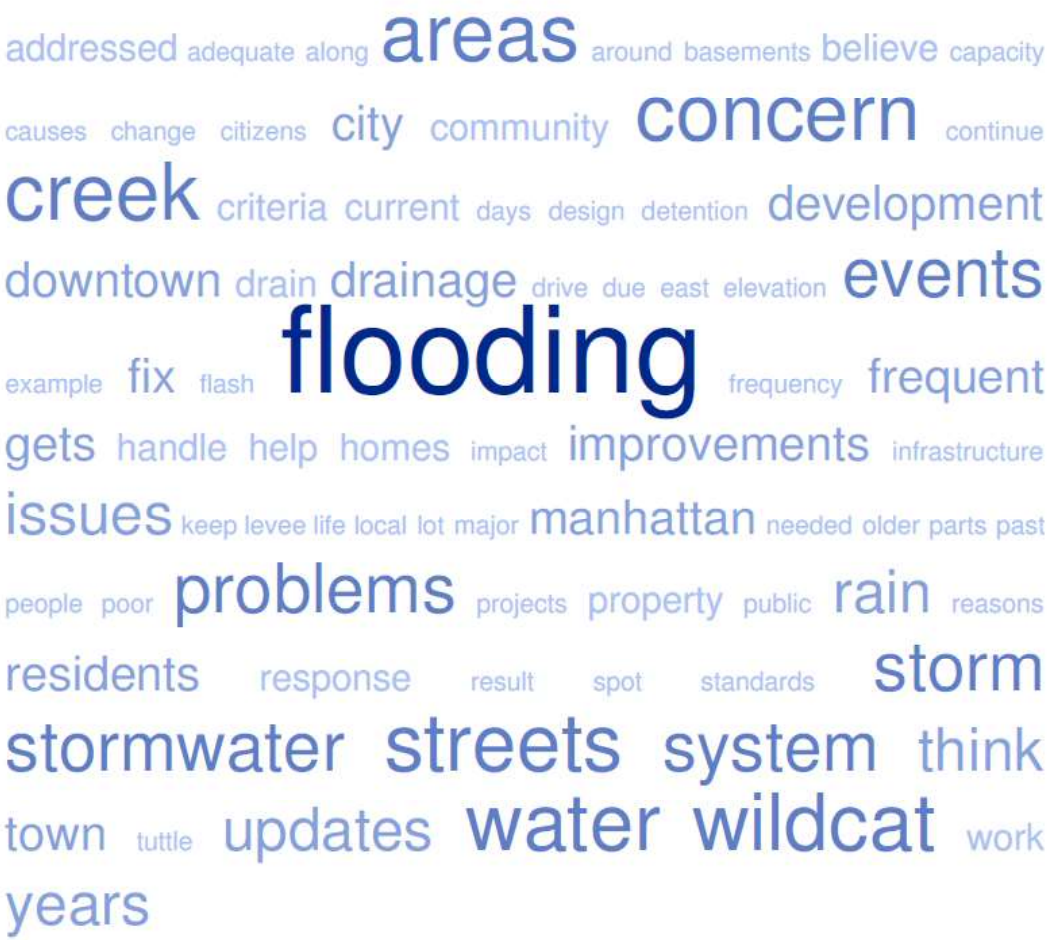


#	PLEASE EXPLAIN YOUR RATING FURTHER.
1	The poor condition rating is probably more for the "older" downtown portion of the City.
2	But it depends on location, some places work great, some don't.
3	Still significant flooding issues. Poor drainage on local roads.
4	A lack of fall to the river creates flooding issues in several residential neighborhoods.
5	need $70 million in improvements
6	Given the magnitude of the stormwater challenges the City faces, the infrastructure that is in place is pretty robust. Some is old or built to prior standards, and other areas of the city are under-served. Future systems would need to be of a different type, more compatible with the environment whenever possible.
7	The streets used for storage and conveyance would be fine except for the occasional longstanding "lakes"
8	Should have had a choice between poor and good: fair. There are obviously problem areas in the oldest parts of town plus Wildcat Creek. However. newer standards have helped to mitigate periodic flooding.
9	Example: gathering spots on streets in poor condition & need to be replaced.
10	Less than 10 yr storm, underground system can not handle
11	Although portions of the system appear to function very well, sizable portions of the overall system appear to have serious capacity issues.
12	Many problem areas that need attention
13	Not that I think it is poor but improvements are not paced to the needs that the community expects. Visual flooding makes the condition appear to be bad which in some areas that is the case
14	Plans are in place, Funding identified and is being applied to needed solutions. From my perspective, this is much better than what I am dealing with.
15	See response below.
16	Many lines are undersized and flooding seems to happen reguraly
17	Concerned about back up and flooding on Little Kitten Creek between Sharingbrook and Windsong, a lot I think impacted from 'above' that area and REALLY suprised at rapid rise in water covering half our parking lot at Stonecreek in the 'Labor Day Flood"; want to make sure we control these things as best we can; not really in tune with details in other parts of city except Garden way and area east of campus
18	If we more than an inch of rain the place floods.
19	In the older parts of Manhattan, the system really struggles to keep up after a deluge, which we're getting more frequently.
20	In certain parts of town
21	Bad flooding with every rain on parts of Colorado St. - mosquito breeding puddles
22	Little continuity between systems.
23	most of the system functions as designed. Some parts are very challenging (flat grade, large runnof area)
24	Live on 4th/Vattier and see roundabout from my window and how big rains are handled on Vattier and Bluemont Ave. But walk in nei. and see backed up water at intersections/curbs routinely and my unpaved alley gets wider/higher yearly keeping water behind my lots from running off more and more.
25	I have not witnessed any major problems in the area, aside from recent 500-year flooding events.

26	Many areas have little or no storm water system to adequately handle moderate to heavy rains.
27	It doesn't seem that the city's stormwater system is able to handle intense rainfall- perhaps the aging system was able to handle the climate of the past, but perhaps not so now.
28	The newer sections of town that have controls in place seem to function well. In fact, some stormwater features appear to be over-built as they rarley retain water after significant rainfall events.
29	too much localized flooding during heavy rains
30	There specific areas that get inundated with flash flooding but otherwise the systems are adequate.
31	Flooding along 3rd St. west and Garden Way need major attention
32	I am aware of issues in parts of Manhattan. Last year N. Juliette storm water system was updated (improved) in front of rental property I own.
33	Some areas function just fine, other areas need improvement.
34	consistent flooding in low lying areas during heavy rain
35	We have flooding almost every single rain storm.
36	The older parts of town need some work.
37	Most areas of the City function very well - the older part of town seems to be overloaded in certain areas
38	Judging by the immediateness of flooding unpon a rain event, the storm systen is undersized or detention ponds need to be implemented.
39	Some good projects but lots of small problems remain.
40	Older infrastructure and frequent flooding
41	Average
42	Drainage systems have not kept pace with increased development/impermeable surfaces and lack of detention/infiltration structures has lead to increased flooding.

Q4 In the 2017 and 2019 Community Surveys, Manhattan residents ranked stormwater infrastructure and drainage as a top priority, and expressed a somewhat high level of dissatisfaction with the current system (42-44% dissatisfied or very dissatisfied and 12% unsure). Why do you believe our citizens are concerned with stormwater and how might updates to our stormwater criteria address this?

Answered: 63 Skipped: 7



#	RESPONSES
1	Almost any amount of rain results in minor flooding from 3rd Street to 10th street in them older grid neighborhoods.
2	The streets in Manhattan are often impassable, and the we need to take a very hard look at Wildcat creek and it's tributaries for obvious reasons.
3	Instances of flooding that happens over and over in the same areas....for example Wildcat Creek at Scenic and North 3srd St.
4	To many problem spots. Not enough man power to catch up with the problem
5	I believe that citizens of Manhattan are more concerned with stormwater now due to the frequent flooding of Wildcat Creek in the last 10 years. It has led to a heightened awareness of stormwater in our community.
6	It is as simple as, some locations not draining as one might expect, and thus the dissatisfaction. In the old part of town, there are street corners that just don't drain. Pools of stagnant water last for days which can be a real pain.
7	Poor drainage on local roads
8	Residents respond this way because all they see is flooding on their streets, possibly getting into their homes or workplaces without knowing the underlying causes. While updated criteria could increase the frequency of curb inlets or tighten width of spread tolerances, all that will likely be gained as a result is additional underground storage. For a significant portion of the community, a lack of elevation change seems to be a major issue.
9	I think some high frequency events have skewed their judgment on the system overall.
10	repetitive flash floods in Wildcat Creek watershed and surface flooding east of campus and in downtown area. Again, $70 million in identified upgrades needed
11	Manhattan sits in a very challenging location, with all 3 types of urban stormwater probems; Big river flooding (Kansas and Big Blue/Tuttle); Flashy major streams (Wildcat) plus low-lying and flat areas in the Ward Districts/downtown. So there are plenty of aspects to cause concern. Also, there are some areas of town that are under-served or for which original designs were deficient. Hopefully as more attention is paid to new design and retrofit projects, the progress will be seen.
12	Problems with the Wildcat Creek flooding. Fix the levee system.
13	Because the streets turn into rivers during almost any storm event. It was shocking when we moved here. I've never seen such a thing in my life.
14	Frequent flooding along Wildcat Creek and in downtown/Bluemont Ave areas. People don't understand what "100 year flood" means. No specific ideas what update criteria is necessary. Continue working on engineering and new development standards that mitigate (or significantly reduce) flooding.
15	poor condition of the system and spot flooding during rain storms
16	Back yard erosion issues not addressed with new subdivision plans by consultants. Less than 10 yr storm, underground storm sewer system can not handle.
17	Keeping residence informed and involved could potentially show a more positive outlook.
18	Flash flooding in low areas. Resolutions are in place, need to be funded and started.
19	The increased frequency of local flooding over the past 10-12 years has brought this concern to the forefront, especially since it also directly impacts a sizable percentage of our population. Updates should be reflective of the actual trends in storm events.
20	Safety concerns, chronic problem areas like Wildcat Creek, less than adequate response from leaders to the problems
21	Because of the actual visual flooding that occurs. Fix what is the worst and this level of dissatisfaction will get better. Two areas which are in the works of getting addressed are the Poyntz and TCB which will help in the bathtub. Watched a city commission meeting where

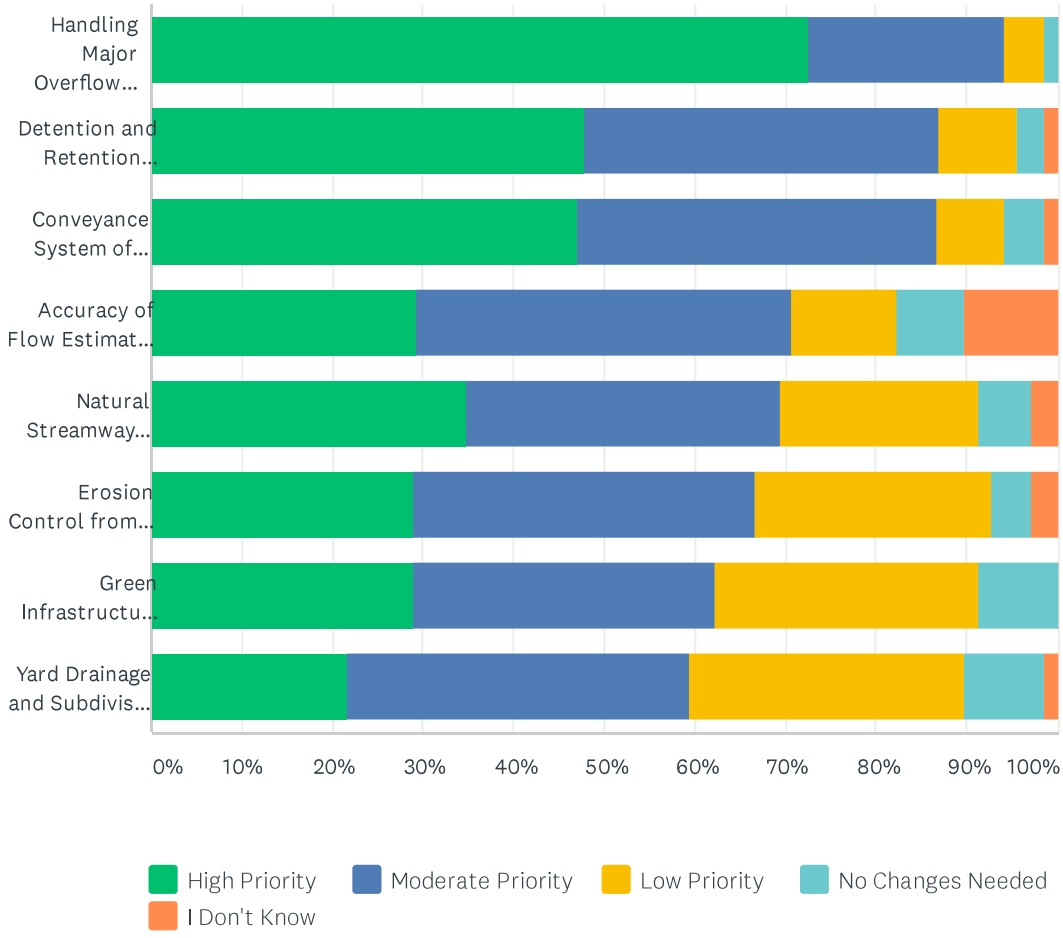
	detention was stated that it does not work. If we don't detain how much more money is needed to upsize to handle the flows.
22	Flooding in certain areas continues to be a big concern, such as Wildcat Creek, and some areas downtown. If you resolved these, the issue would be much less pressing.
23	The eastern side of Manhattan is very flat and not much elevation difference for water to get away quickly. Maybe more inlets to drop the water into and off the streets. Must keep the inlets clean from yard waste, debris and trash.
24	Streets do not drain well during or after storms. Water sits on many roadways throughout the City for days after it rains, and never drain but simply evaporate. Some streets flood nearly completely, regularly (side streets around Leavenworth/Juliette). Even main roadways will flood one or more lanes during frequent summer storms, like west Anderson Avenue. This, on top of the flooding of developed commercial and residential areas in the past few years with seemingly no response from the City has raised concern with residents on the handling and design of the current system.
25	Residents recognize the flooding issues across the community and inadequate storm sewer in older portions of town. Updates to policies that could combine individual detention and water quality requirements into regional/community scale improvements could lead to very visible improvements.
26	I believe our citizens are concerned due to many reasons. The biggest being the risk to homes and businesses of potential flooding. Another reason is that Manhattan's amenities (trails, sidewalks, parks) become unusable as a result of poor drainage standards and design which effect the everyday life of the whole community. Updates should include more stringent standards that, over time, will remedy these and many other problems.
27	People along Bethany and Gardenway have lost their homes and a lot of flooding near Scenic Drive/StoneCreek, Pebblebrook area for one need to be addressed. Downtown, east campus have their own issuesso yes they are concerned and rightly so.
28	NA
29	The flooding and loss of property/housing and maybe life.
30	We have to make it more efficient for the older/central parts of town. Driving is greatly affected, residents get water on the property and in their basements. It's been this way for decades and needs to be improved.
31	They are concerned because they see so much flooding in the streets in the ward districts and then they see the flooding of Wildcat Creek, which is unrelated and then they remember how high the water level was in Tuttle Creek dam a year ago...again, unrelated. They also hear the talk about the need to improve the levy plus the worry about how weather patterns have changed/are changing because of climate change. Combined, all the public hears about is water and when the stormwater system can handle the current capacity it causes justifiable concerns.
32	Flooding
33	Large puddles lasting for many days are a perfect mosquito breed ground. Very bad mosquito problems around Colorado Street and 5th and nearby intersections.
34	Water quality and reduce downstream flooding is important.
35	For a short time after a huge downfall there are drainage problems
36	People don't like flooding, obviously, but it seems like in MHK, the economic proposition is tough. Some parts of town have minimal issues while other parts will require major investment to make small improvement.
37	I assume flooding, esp. of basements, and increasingly frequent weather extremes. I have a slab accessory bldg that even gets water inside, for ex. Altho spent thousands improving grading/drainage. (Thus not happy to see alley less able to drain water from lot.) I see water gets up to sidewalk in big rains and approaches home. My basement gets very little water..so far....keep it that way!
38	I think certain hotspots are a consistent nuisance, such as eastern Bluemont Ave. and historic neighborhoods east of City Park. This is a problem spot and is due partly to dated stormwater

	systems that needed upgrading and the fact that this area is on a historic floodplain with poor soil drainage.	
39	Recent flooding events.	6/5/2020 4:51 PM
40	See response to question 3.	6/5/2020 4:09 PM
41	I believe citizens see flash flooding, smell, soggy lawns, crumbling curbs, flooded intersections, sandbags, pumps, etc., and realize aging stormwater systems cannot handle the present and future Kansas climate.	6/5/2020 2:35 PM
42	The older parts of town still have flooding issues. Just fix what doesn't work well anymore.	6/5/2020 2:07 PM
43	too much run off to be accommodated by drainage system currently in place	6/2/2020 9:26 AM
44	Stormwater has become a hot topic with flooding downtown and near Aggieville as well as around Wildcat Creek. I think some folks are feeling the impact that have not in years past which is causing much of the concern.	6/2/2020 5:18 AM
45	Flooding of streets, homes and businesses	6/2/2020 5:15 AM
46	Work is currently underway for better stormwater control but many are unaware of it other than interupting traffic on FRB.	6/1/2020 8:09 PM
47	Some of the existing storm water infrastructure is old, original and in need of updating and enlarging.	5/31/2020 1:19 PM
48	They may partly be concerned because they don't understand it and want assurance they are protected. Others may have been flooded and don't want a repeat event. Others may find some stormwater treatments a nuisance or ineffective. Stormwater criteria need to leave room for flexibility since not every situation has a cookie-cutter fix. There are so many viable options to fix any particular issue. And even more yet to be discovered. Remain open-minded and less critical of ideas which are not your own.	5/29/2020 2:12 PM
49	consistent flooding in low lying areas during heavy rain. Update could address the lack of capacity	5/28/2020 7:55 PM
50	Because of all the continued flooding. We are proposing a new levee that is in the process and the people think this will help with the flooding however this won't help the continual flooding from big rain storms. I feel like the public knows this is a problem and most think the new levee will stop it. It won't, the new levee has nothing to do with it unless Tuttle has to open the flood gates.	5/28/2020 3:54 PM
51	Regular flooding of streets and properties in the lower elevations of the city. Erosion and periodic flooding along Wildcat Creek. Compounding the above issues is that fact that the past few years have been particularly rainy, with several unusually large rain events.	5/28/2020 3:39 PM
52	I think the residents dissatisfied are probably getting impacted by flood waters in one way or another. I think the criteria has little to do with the current flooding. The criteria addresses new projects and additions and I do not believe new projects should be responsible for fixing old problems, they should only be responsible for not making existing problems worse or creating new problems.	5/28/2020 3:14 PM
53	Flooding, standing water	5/28/2020 3:00 PM
54	I think the biggest concern comes from the high visibility flooding events over the last ten years. Residents blame a lot of this on over development and the new development not taking adequate measures to alleviate runoff. I think they also point at new development for overtaxing old infrastructure.	5/28/2020 2:43 PM
55	Flooding and the damage to their property. Traffic disruptions and vehicle stall outs. Larger capacity or storm detentions would help.	5/28/2020 2:24 PM
56	FREQUENT FLOODING	5/28/2020 2:21 PM
57	There concern is likely tied to very recent stormwater and/or flooding instances, i.e., the 2018 Labor Day flood. This specific example is tied more to areas outside of the Manhattan city limits and updates internal to Manhattan would only marginally help with this specific example. Otherwise, I am of the opinion that the majority of the stormwater system is adequate.	5/28/2020 2:17 PM
58	Wildcat Creek flooding. Inadequate downtown area lavk of drainage.	5/28/2020 2:15 PM

59	We have a lot of dated infrastructure and recurring localized flooding events.
60	Concerned by the frequent flooding and damage to property/inconvenience. Updates my restrict some development
61	propensity to flood streets
62	Because the streets flood at a 15-30 minute heavy rainfall. The gutters have too much spread which decreases travel to 1 lane or makes travel more difficult.
63	I believe it is the flooding events of Wildcat Creek and the old section of town that drive this negative perception. Other than those limited occasions, the stormwater system appears to be very adequate. Day to day rains and minimal flooding are acceptable, it is those big events that garner the negative publicity.

Q5 For each topic below, please rate how high a priority you place on making improvements to the standards. (If you are not familiar with our technical standards, please answer in terms of your observations from newer construction. If you are not familiar with Manhattan directly, please answer in terms of issues of general concern on new construction in other communities, it is likely we share many of the same issues.)

Answered: 69 Skipped: 1



	HIGH PRIORITY	MODERATE PRIORITY	LOW PRIORITY	NO CHANGES NEEDED	I DON'T KNOW	TOTAL	WEIGHTED AVERAGE
Handling Major Overflow Events/Floodplain Management	72.46% 50	21.74% 15	4.35% 3	1.45% 1	0.00% 0	69	3.65
Detention and Retention Systems	47.83% 33	39.13% 27	8.70% 6	2.90% 2	1.45% 1	69	3.34
Conveyance System of Pipes, Inlets & Ditches	47.06% 32	39.71% 27	7.35% 5	4.41% 3	1.47% 1	68	3.31
Accuracy of Flow Estimates (Hydrology)	29.41% 20	41.18% 28	11.76% 8	7.35% 5	10.29% 7	68	3.03
Natural Streamway Protections	34.78% 24	34.78% 24	21.74% 15	5.80% 4	2.90% 2	69	3.01
Erosion Control from Construction Sites	28.99% 20	37.68% 26	26.09% 18	4.35% 3	2.90% 2	69	2.94
Green Infrastructure/ Water Quality Enhancements	28.99% 20	33.33% 23	28.99% 20	8.70% 6	0.00% 0	69	2.83
Yard Drainage and Subdivision Grading	21.74% 15	37.68% 26	30.43% 21	8.70% 6	1.45% 1	69	2.74

Q6 For the priorities you gave on the previous question, please explain further. Please also share any other general feedback you have regarding stormwater management.

Answered: 48 Skipped: 22

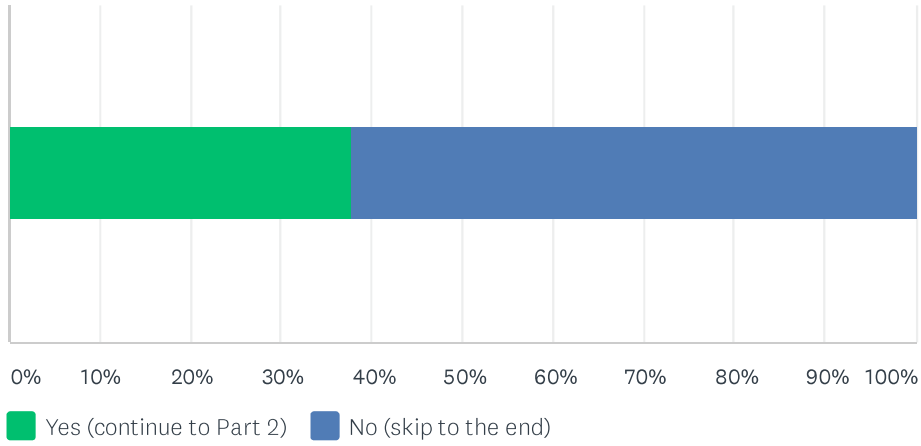
#	RESPONSES
1	The first two items were about the actual removal of storm water. The other items are all part of the system and need attention in order to help the first two items remove the water.
2	Manhattan as a city needs to focus a lot harder on cracking down on new construction in terms of water runoff, erosion, and location in regards to flooding. We are growing at an exponential rate and yes this is good for the tax base, but at what future cost?
3	We need to find a way and the resources to detain water UPSTREAM and hold it until the downstream collectors can catch up.
4	The wide variation in the calculation of stormwater flows (hydrology) when using different methods has always bothered me. Being able to more accurately estimate flows specifically for Manhattan is of interest to me.
5	Not sure some areas are designed for the capacity they are required to handle...
6	I am not intimately familiar with the standards so I marked overall topics that are of the most importance.
7	Retention, conveyance and floodplain management seem to be the biggest impact items in reducing regional flooding in the City.
8	seems that some construction sites are not monitored very often. Green infrastructure is cheaper than hard infrastructure
9	The resiliency of the storm system is based on overflow pathways and floodplain management. Pipes and inlets are only one half of the system, but people are sometimes lulled into thinking its the entire system. Detention/retention can be tricky systems to make work correctly, but Manhattan could probably get better outcomes, and the design and sizing of those needs more careful scrutiny. Newer systems need to be more environmentally sensitive whenever possible. It would be helpful to find some more large-scale regional solutions where appropriate, though those take more up-front planning.
10	Fix Wildcat Creek flooding.
11	Need to continue to develop/add control of amounts and rates of runoff, and methods of managing it.
12	Example: Curb & gutter system in Northview addition prevents drainage - water stands for weeks in the street at 2161 Griffith Terrace.
13	Subdivision plans are poorly designed by local consultants, bare bones design. Often lacks detail and any real thought about future problems.
14	Re-examine detention policy. Many that are required right now serve no purpose other than costing developers money and will be obsolete once city puts in new system. I support a fee in lieu situtaion.
15	Poor stormwater drainage impacts the entire community and costs both the public and private individuals a lot of money to repair damages and remediate an inadequate system.
16	No comments
17	My personal opinion is to get the water away as quickly as possible, which will also help the major events.
18	Detention requirements should be adjusted for the project's location in the overall watershed. Blanket standards do not always fit. Green infrastructure requirements should be further defined- specific pollutant and treatment goals and goals should be realistic. Move towards an in lieu fee option to implement larger scale detention and treatment facilities.
19	In other cities, stormwater management and best management practices (BMPs)/Water Quality Enhancements are given a rating system. This doesn't exist in Manhattan.
20	Certainly new subdivision construction has to be graded in a proper manner upon initial planning and construction. Don't mess with mother nature is also a good motto. In our local area I think there is a lot of debris from yards, trees, shrubs; some natural and a lot not so natural ending up in the Little Kitten Creek basin causing obstruction and blockages putting

	pressure on theWindsong and the Sharingbrook people but is not their fault and most not caused by them. Regarding Wildcat Creek: A LOT of natural drainage and retention area has been developed in the Scenic Drive area and either estimates on water run off and flow are wrong or something else is going on the contribute to the storm water issues
21	Green infrastructure enhancements in urban areas greatly decrease the stress on the natural environment. It's very innovative that that is added to the list of concerns.
22	Wildcat creek needs to be upgraded because it effects a lot of citizens in Manhattan.
23	We have to do a better job of handling deluges. In addition, we need to do a better job of estimating the impact of construction projects on erosion and increased water runoff. I've been impacted by both.
24	Muddy sidewalks are a slipping hazard. Sidewalk maintenance needs to be enforced. Public education on beneficial planting to reduce runoff would be helpful.
25	Incorporate recreation and sidewalks/bike paths into the drainage corridors.
26	We've had a couple of pretty big rainfall/flood events in recent years. This may be anomalous, or may be more of a new normal. conveyance of storm water safely out of residential areas is top priority in my mind. Others are important, but not as pressing.
27	As resident, it all seems very important. Sorry. Was thinking that, in my naive understanding, bioswales on lawns might be something homeowners like me should consider as part of strategy.
28	I am not a drainage engineer, so this is from my estimation only. It seems like enhancing natural drainage systems would be a cost-effective fix along with adding/improving greenspaces in urban setting with extensive impervious surfaces.
29	Efforts should be made to address areas prone to flooding around businesses and major intersections first.
30	Priorities: managing the water better where it falls (store runoff, use collected water for irrigation/supply, etc. General feedback: Find ways to better engage the community (such as with this survey) to build citizen knowledge of stormwater issues. Citizens will need to be prepared for increased spending on stormwater projects.
31	Your question asked about updating the standards (I assume this means engineering criteria and construction methods) The standards seem adequate to me, the execution and discipline to follow those standards is suspect. Especially in the area of Floodplain and Erosion from Residential Construction (which is a free-for-all with no enforcement until after the problem occurs) Why isn't the homebuilder required to submit an erosion control plan with a building permit?
32	too much concrete has went in over the last 25 years and drainage has not been adequately planned for all the concrete.
33	Much of what our office deals with is complaints regarding drainage issues between residential properties. Some of this could be handled better if there were lot-specific grading plans that are laid out as a part of the development.
34	Protection of areas previously out of the floodplain and now in need to be addressed to protect property values.
35	Control and management of Wildcat Creek should be a priority for the city. It also could be landscaped as a valuable recreation area.
36	Rivers and creeks need room to move and expand. Development in these areas needs to be closely monitored and both the enforcers and the landowners need to know the risks and repercussions of their actions in these areas. Be transparent.
37	Local low area flooding needs to be fixed first because it should not be happening. Flooding in a flood plain is to be expected and those that build in a flood plain should expect to get flooded...fixing these challenges are more expensive and difficult.
38	We have a levee already fixed the storm drainage in areas where we see continual flooding from pretty normal storms.

39	I've indicated detention/retention systems as a high priority because I believe this to be the most effective means to accomplish widespread benefit quickly. I believe regional detention/retention facilities will be more effective than individual/site specific facilities.
40	The engineering methodologies and principles are generally the same now as they have always been. For now it is the best information and methodology we have so we can't really. change that methodology. What we can change is the design storms utilized, or even the allowable minimums and maximums in the criteria. I also believe we put too much emphasis on yard drainage on private property. These types of issues are private property issues and unless runoff from City ROW is causing a problem on private property the City should not be involved. This comes down to personal responsibility of a homeowner. I think the idea of green infrastructure is great, but I also don't feel and the data supports it is not making a difference in stream water quality. I feel like this is money is not well spend and would be better spent on education, larger scale projects, and other projects that could benefit the watershed. Education is key to water quality. People have to want clean streams and rivers.
41	We need to ensure that storm systems are constructed properly while also ensuring that downstream areas are not affected during the construction process by sedimentary runoff.
42	It seems like systems are already in place for handling a number of the areas listed above even if the general population isn't aware of them.
43	Detention is a means to help the existing systems handle the piped and open channel capacities. Being able to better predict hydrology the better we can long range plan ahead.
44	Prevention is always better. Addressing broad brush issues at the beginning of the storm water cycle (detention and percolation with more natural systems) will reduce the need for expensive, difficult to retrofit, and difficult to maintain- gray infrastructure.
45	Underground systems seems to be undersized, specifically in the eastern/southern half of town. Green infrastructure should be kept to a minimum as possible to meet national requirements. Green design is inefficient, high maintenance, and increases the cost of living for a location already expensive to live in.
46	conveyance capacity directly affects time of dissipation, potentially reducing flooding
47	Capturing water so streets don't flood, while also detaining it no to increase flooding down stream all rely on accuracy of flow estimates.
48	I believe design and construction efforts in new developments or street construction adequately addresses the drainage needs, so I would recommend putting effort into the larger scale projects that will address the major flooding events.

Q7 Are you a stormwater designer or are you directly involved in the development and plan review process?

Answered: 69 Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes (continue to Part 2)	37.68%	26
No (skip to the end)	62.32%	43
TOTAL		69

Q8 FOR DESIGNERS: Of the topics you rated as highest in need of improvement, what are several specific technical recommendations you would offer? (Leave blank if not applicable.)

Answered: 18 Skipped: 52

#	RESPONSES
1	Hydrology methods need to be brought up to date and consistent, built around the SCS Curve Number methodology (current state of practice, especially for detention) Rational formula OK for limited purposes. Natural stream conservation and other more passive , natural techniques could be favored for larger streamways. Pipe and inlet standards are pretty good overall. Best industry practices are FHWA, NRCS, and HEC primarily. Studies done for projects needs to demonstrate more insight on actual site and adjacent issues and done early to open up time to find good solutions.
2	Use of regional detention for regional quantity and quality treatments versus in
3	First priority - greater care on the part of designers and builders in establishing safe FFE's. Second priority - Having a checklist of all the key issues a design consultant should evaluate in making design solutions and include those responses with each building permit application. Although some of those check list items may not be applicable to a particular project, it will help all conscientious designers as reminders (we all are guilty of overlooking potential issues or asking ourselves pertinent questions - not only for the site being addressed, but immediate upstream and downstream conditions.). Licensed professionals have an obligation to the public.
4	Regional Detention, upsizing of downtown conveyance infrastructure.
5	Identify areas in community scale watersheds that should or should have detention implemented. Development that will not produce a pollutant load should not require permanent BMPs.
6	Provide a rating system to meet BMP or water quality standards
7	Drainage corridors can become amenities in addition to improving water quality and minimizing flooding. Good design can reduce development costs and increase property values.
8	When to provide detention and when not to.
9	I know this has been discussed, but I believe a fee-in-lieu-of stormwater detention policy would be very successful here. If there isn't one already, I think a citywide stormwater model which is updated with each improvement project would be very helpful in ensuring priorities are addressed first and new projects are not compromising existing downstream infrastructure. We often have difficulty discerning downstream tailwater conditions, especially when we need to tie our project's storm drainage system into an existing enclosed system.
10	More fitting design storms. We need to move away from the 24-hour storm. It's not realistic any more or maybe never was. Detention needs a hard look. Detention everywhere does little to separate peaks. I think the City needs to develop a map of areas of the community (upper reaches) where detention makes sense and then expect development to incorporate detention in those areas. In the lower reaches we need to look at how we can speed up water and potentially have development projects contribute an in lieu fee that would go to larger projects in larger areas to accomplish this. Post Construction BMPs need a different implementation discretion system. It's too vague right now. Many communities have gone to a points system where the impact of the project is measured is in points based on various criteria (mainly impervious area added) and then the goal of the designer is to implement BMPs that also have points associated with them to offset the impacts. The goal being to end up a zero balance. This system is very intuitive.
11	Water control structures upstream on landowner properties desiring them, buying out properties, replace storm sewers with bigger pipes downtown
12	"Big" picture needs to be kept in mind from the start. City Staff reviewing plans get overwhelmingly caught up in very fine and VERY meaningless details of a stormwater system which is based on very broad, highly variable, and VERY inaccurate measurements and assumptions, then believe there is validity in, for example, worrying about whether the depth in the street's curb and gutter is 0.33' or 0.35'.....as if you can accurately measure this and as if the accuracy associated with defining time of concentration, flow path, and even size of contributing watershed were precise. Not. Even. Close. So don't lose sight of the "big" picture and, again, worry about 0.02' of depth in a curb flowline - as just ONE example. Meaningless and expensive exercise for a designer and totally irrelevant.
13	Fee in-lieu for redevelopment sites that reduce sprawling and expensive infrastructure and

	create a denser, more efficient stormwater system.
14	BMP Manual
15	Inlets based off gutter spread not capture rate
16	There is a lot of acceptable methods out there for design. I would like the new manual to specify what methods and programs are acceptable.
17	Design for the watershed rather than the particular neighborhood or district.
18	Nothing specific, just suggest focus on the big ticket projects that will alleviate the flooding recent flooding events. All new construction seems to be adequate.

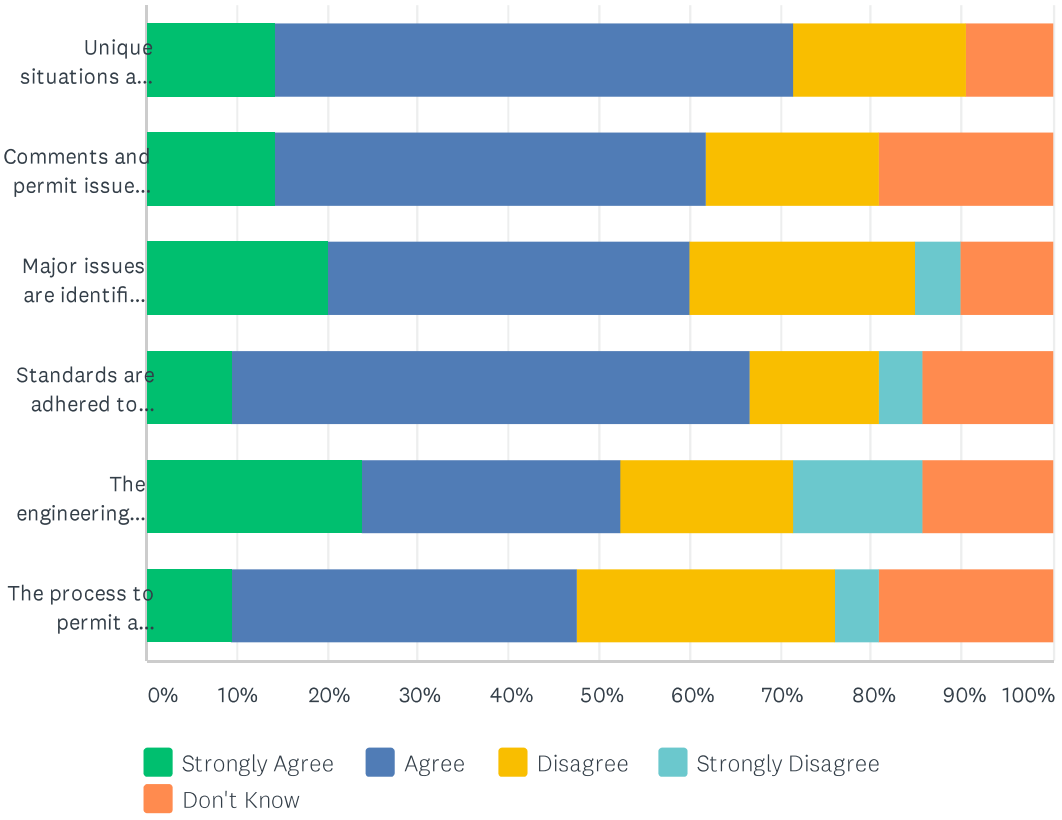
Q9 FOR DESIGNERS: Which computer models do you find most useful for stormwater design? (Leave Blank if not applicable.)

Answered: 15 Skipped: 55

#	RESPONSES
1	HEC-HMS and HEC-RAS and Carlson Hydrology sewer network software
2	Personal Spreadsheets, HEC-RAS, SWMM
3	HEC-series HMS and RAS; Hydraflow Storm and Hydrographs, since it is part of AutoCad.
4	AutoDesk Hydrographs
5	PondPack, Sewer GEMs, Hydraflow
6	3D HEC-RAS Modeling!!
7	Bentley Pond Pack, Autodesk SSA
8	AutoCad Civil 3D Extensions (Hydrographs, Express, Storm Sewer, Stage Storage), HEC-RAS
9	Have not tried them all so I'm not equipped to fairly answer this question.
10	Storm and Sanitary Analysis (Autodesk) Pond Pack V8i (Bentley)
11	Hydraflow by Autodesk.
12	Storm and Sanitary Analysis by AutoDesk
13	Autodesk
14	Bentley Pond Pack, Hydroflow, HEC HMS, HEC RAS
15	Models are only as good as their assumptions which must be calibrated with field measures. We don't have enough field measures, thus our model predictions may be off by orders of magnitude.

Q10 FOR ALL THOSE INVOLVED IN DEVELOPMENT SUBMITTALS: We are interested in your views on the City of Manhattan's platting and/or construction plan review processes as they relate to stormwater issues? Please indicate if you agree or disagree with the following statements.

Answered: 21 Skipped: 49



	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	DON'T KNOW	TOTAL	WEIGHTED AVERAGE
Unique situations are handled with flexibility and creativity, while meeting the intent of the standards.	14.29% 3	57.14% 12	19.05% 4	0.00% 0	9.52% 2	21	2.95
Comments and permit issues are handled in a timely manner.	14.29% 3	47.62% 10	19.05% 4	0.00% 0	19.05% 4	21	2.94
Major issues are identified early in the process.	20.00% 4	40.00% 8	25.00% 5	5.00% 1	10.00% 2	20	2.83
Standards are adhered to consistently and fairly.	9.52% 2	57.14% 12	14.29% 3	4.76% 1	14.29% 3	21	2.83
The engineering effort and costs involved in obtaining approvals are reasonable considering the scope of the project.	23.81% 5	28.57% 6	19.05% 4	14.29% 3	14.29% 3	21	2.72
The process to permit a project is clear to understand.	9.52% 2	38.10% 8	28.57% 6	4.76% 1	19.05% 4	21	2.65

#	PLEASE EXPLAIN FURTHER AND FEEL FREE TO OFFER SUGGESTIONS FOR IMPROVEMENT.
1	The best outcome comes from a process where there is early consideration of issues and transparent communications, with problems acknowledged. Engineering is a collaborative effort, designs should be logical and explained. The advantage of dealing with stormwater early is it outlines fundamental constraints dictated by a site that will usually remain consistent regardless of land use, and more economical and sustainable designs come when working with the stormwater rather than against it.
2	As a Planning Board member I rely entirely on City staff reports regarding stormwater issues for items that require the Boards' review. The Board and staff have had several discussions and updates on overall stormwater issues and the impact on various areas of the city. It can be difficult to address project-specific stormwater management, which may meet site planning standards, and its impact on the "global" stormwater issue.
3	Storm water management should include Wildcat Creek, the Big Blue river and the Kansas River with a goal to also do much more to make all three public recreational areas.
4	To disagree with any one of these means to disagree with all. We may do better with a selection to choose from rather than standard choices. Every situation is too unique to have standards.
5	A lot of this is timing. Sometimes we are asked for a lot of information at a step in the process (zoning) where stormwater details are not the critical path. Putting this information together is costly for a project that may never make it out of zoning. I also think that developers are held responsible fixing problems they did not create, which is not fair.
6	Our engineering costs are increasing within the City of Manhattan. Reviews that specifically change the project are coming in toward the end of projects causing for rework, we are guessing at what methods would be acceptable to use, review comments and responses take awhile to get back at times, We now seem to be required to submit every little finite detail and calculation to be reviewed, rather than trust and leave the libability up to the engineers who stamp and seal the plans.