



**CITY OF BOULDER**  
**Planning and Development Services**

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To whom it may concern,

The following provides a comprehensive list of questions and responses regarding the proposed Boulder Creek Commons development located at 5399 Kewanee Drive. Responses are provided by City of Boulder staff, the city contracted 4<sup>th</sup> party consultant (Anderson Consulting Engineers, Inc.), and the developer contracted consultants.

**Site Plan/Construction**

- 1. The engineering drawing of the site shows a 12 foot wide path over the buried irrigation pipe along dry creek ditch. Who will be responsible for maintaining the path after the development is complete?**

*See attached information provided by the applicant (Attachment A).*

- 2. Will the path be paved, dirt, or gravel?**

*See attached information provided by the applicant (Attachment A).*

- 3. In the event that it is dirt or gravel, how will the weeds be dealt with?**

*See attached information provided by the applicant (Attachment A).*

- 4. Almost every neighbor adjacent to the ditch/path has mature trees and most of the trees overhang the present ditch. Major excavation will be required to bury the dry creek ditch pipe, put in the path, and put in the flood channel. Will there be an impact to the trees during construction and with future maintenance?**

*See attached information provided by the applicant (Attachment A).*

- 5. In the current site excavation plan it shows 2-5 feet of fill being brought in across the site. Is that correct and what is the total amount (cubic yards) that will need to be brought in. How many truck trips will that require? What is the typical length of time for doing the site preparation?**

*The applicant has the following response:*

*“We estimate that the Boulder Creek Commons project may need 35,065-CY of imported fill. Our earthwork estimate is based on the most current grading plan “Preliminary Grading Plan – West” dated 12/21/12.*

*The type of specific truck used to haul this material to the site has not been determined. The earthwork contractor will determine the type of truck(s) used on the project. Several factors will determine the type of truck: location of material source, weight of material, and when the fill material is needed as earthwork progresses on-site. "*

### **Flood**

- 6. In the storm water report they show two representative cross sections of the proposed flood channel, one south of Kewanee and one north. Is the vertical scale the same as the horizontal scale?**

*Under the drawing title, it says, "No Scale". This indicates that it is schematic and should not be scaled either vertically or horizontally.*

- 7. Can it be assumed that the relative vertical positioning is representative of the design? Is the top of the ditch pipe located below the bottom of the channel?**

*Assumptions on the location of the pipe should not be made based on the schematic drawing.*

- 8. To determine flood elevations would it be safe to assume that the elevation of the bottom of the channel is the elevation shown in the site topography plan and that the flood elevations would be 2.8 feet above that?**

*No, the flood water elevation per the calculations is 2.5 feet above the channel bottom. An additional 1/3 flood flow was added to show that the freeboard requirements were met and this calculation shows the water elevation at 2.75 feet above the channel bottom, but this is not the flood water elevation.*

- 9. The proposed flood channel depth appears to be 2.5 feet. What are the flood elevations in the channel? Will the flood level in the channel be higher than existing flood levels or adjacent homes?**

*The proposed grading ties into the existing grades at the western property line and then slopes down for the drainage channel. Please clarify where you see the water surface elevations above the existing homes.*

*See attached information provided by the applicant (Attachment A).*

- 10. Does the 177 cfs flood flow include the flows along the Superphostical/Howard ditch that is just over the property line? Why or why not? Would it be safe to assume it carries at least the same amount of flood waters as Dry Creek ditch (177CSF)?**

*The proposed project includes the construction of a drainage channel that exits the property south of the Superphostical/Howard ditch, therefore these flows do not merge on the project site and do not need to be added to the design of the drainage channel. The project design will need to comply with the city regulations and the applicant will need to demonstrate that the stormwater discharge off of the property matches historic conditions.*

*In reviewing the floodplain mapping associated with the Howard ditch, it appears that the floodwaters associated with this ditch are more of a backwater effect than an actual conveyance of the South Boulder Creek flood waters. I would not assume that the flood flows of these two ditches would be similar.*

*See attached information provided by the applicant (Attachment A).*

**11. How fast does the flooding come into the property?**

*This information would need to be extracted from the floodplain model and is not readily available.*

*See attached information provided by the applicant (Attachment A).*

**12. How long does the flooding last?**

*This information would need to be extracted from the floodplain model and is not readily available.*

*See attached information provided by the applicant (Attachment A).*

**13. What is the overall flood volume and duration?**

*This information would need to be extracted from the floodplain model and is not readily available.*

*See attached information provided by the applicant (Attachment A).*

**14. What will the depths of the 100 and 500 year FEMA floods be at Kewanee?**

*The design calculations for the culvert under Kewanee Drive were not included with the preliminary drainage report but will be required with the Technical Document application.*

*See attached information provided by the applicant (Attachment A).*

**15. How much volume and flow will be directed along the street systems out to that north end in the 500 year flood?**

*This information is not required to show compliance with the city's floodplain regulations and is not readily available. It would need to be extracted from the floodplain models.*

*See attached information provided by the applicant (Attachment A).*

**16. Is the flood channel height 2.8 feet above the base elevations of the channel shown on the site plan?**

*See attached information provided by the applicant (Attachment A).*

**17. With the regrading of the EBCC soccer fields a 20,000 square foot pile of earth was removed and the entire south end was regraded. The width of the flood channel on the north was reduced from 150 feet to 100 feet due to 2-5 feet of fill being brought in right to the western boundary. How will these changes affect both the pre and post development flood flows?**

*Ground conditions change over time. Only changes within the flood conveyance zone require a floodplain analysis. Grading and filling within the flood fringe area is allowed under the city's current floodplain regulations.*

*The flood conveyance zone is the area of the floodplain that is reserved for the passage of flood waters. As mentioned above, grading and fill within the flood fringe area is allowed under the city's current floodplain regulations.*

*See attached information provided by the applicant (Attachment A).*

**18. Only flood channel flow rates are given but not storm duration or storm volume. Did they not provide or use hydrographs? Is this normal in designing such a floodway?**

*The project does not include a floodway, but a drainage channel is proposed along the western side of the site. Hydrographs are not typically used for a drainage channel analysis. Storm water conveyance systems are designed for peak flows and detention / retention systems based on volumes. The city does not evaluate the hydrographs for conveyance systems. The city did not, and is not going to provide hydrographs from MIKE Flood as this requires post processing of model results that the city does not need for its studies. The peak flow value is typically the controlling design parameter for storm water conveyance systems.*

*See attached information provided by the applicant (Attachment A).*

**19. What impacts a flood will have to the transportation system in an emergency?**

*Yes, there are issues with the transportation system during flood events. This is problematic throughout the city and people need to be aware and try not to drive during a flood event. Our flood preparedness program includes roadway inundation mapping by event so responders can act accordingly.*

**20. Has staff done a review of the flood study?**

*A floodplain analysis is not required for this project since there are not proposed impacts within the flood conveyance zone. A preliminary drainage report (not a flood study) was submitted with the site review application and development review staff have reviewed the report. The staff comments on the site review application are available.*

**21. Is it normal for a designed flood channel to spill out into a City park without any receiving infrastructure?**

*The developer is required to return the flows to pre-development condition as they leave the property. This is a common practice within the city.*

**22. Why isn't there modeling being done?**

*Modeling is only required for improvements within the flood conveyance zone. The proposed flood channel is not within the conveyance zone, so modeling is not required. Using the peak flows for sizing the channel is the standard engineering practice. The 100-year peak flood flows were taken from the MIKE Flood model and used for sizing the flood channel. The rational method was used for sizing site infrastructure, per the City Design and Construction Standard and UDFCD Standards. Storm drainage systems for single family residential development are designed for the 2-year event (initial storm), all*

*other land uses are for the 5-year event. However, the 100-year event (major storm) must be evaluated for sizing detention ponds*

**23. What will happen at the Kewanee/floodway junction in a flood? What kind of problems may occur with the floodway impeding access to the site and also blocking access out of the site?**

*Please note that the flood channel is not a floodway. Both the City DCS and the UDFCD standards recognize that street systems act as drainage systems during major storm events. During minor storm events, residential/local street flooding can spread to the street crown, but no curb overtopping can occur and there is a maximum depth of 6-inches in the cross pan. During the major (100-year) flood event the flood water depths cannot exceed 18 inches. The developer is not required to have all streets remain free from storm water during the major storm event.*

**24. What about blockage of the culvert?**

*The city factors in debris blockage in major drainageway improvement studies. This ranges from 5-100% depending on the size of the culvert and drainageway characteristics. It will be evaluated as the design progresses.*

**25. Are there other storm risks that the city has documented in the past (e.g., the Lower Basin Storm)?**

*As previously discussed, the South Boulder Creek flood study and mitigation plan is using a different storm event centered further up in the basin. Looking at the lower basin storm is not a regulatory requirement for the development.*

**26. There has been a request from the neighborhood for information regarding how they can contract with the City flood consultants to provide the detailed flood data (hydrographs and depths) from the 100 & 500 year FEMA regulatory flood data. Who should we contact? What is the typical cost?**

*The city can facilitate getting this information to the neighborhood. Please provide a detailed list of requested information and we will ask CH2MHill to provide us with a fee proposal for this work.*

**Groundwater**

**27. Why are area drains proposed on the site?**

*See attached information provided by the applicant (Attachment A).*

**28. What is the location and depth of the area drains?**

*See attached information provided by the applicant (Attachment A).*

**29. How much water is projected to be moved by the drains?**

*See attached information provided by the applicant (Attachment A).*

**30. Where will the water be routed to?**

*See attached information provided by the applicant (Attachment A).*

**31. Is the developer intending to route groundwater through the drainage swales?**

*See attached information provided by the applicant (Attachment A).*

**32. Will the underdrains compromise the core function of the swales, i.e., to capture and detain stormwater runoff?**

*See attached information provided by the applicant (Attachment A).*

**33. Will the underdrains either decrease groundwater flows to the wetlands to the east or increase the flows for the adjacent homes to the west and north?**

*The wetland mitigation plan does not address groundwater changes, but explains that the hydrology to support the wetland areas will come from the irrigation ditches in the area. They have 3 shares of the Dry Creek Ditch #2 to draw from.*

*See attached information provided by the applicant (Attachment A).*

**34. Will moving groundwater to the north of the site exacerbate the sump pumping problems for the adjacent homes?**

*See attached information provided by the applicant (Attachment A).*

**35. Is routing the outfall of a home drain system into a drainage swale allowed under City regulations?**

*Permanent groundwater discharge to the proposed storm sewer system is acceptable per Section 11-5-5, Discharges to the Storm Water Utility System, of the Boulder Revised Code, 1981. Discharge of uncontaminated groundwater from an individual single-family residential detached or duplex foundation drainage system is exempt from discharge permit requirements. The proposed drainage swale is considered one section of the future storm sewer system for the development.*

**36. Will the ditch company accept the groundwater?**

*See attached information provided by the applicant (Attachment A).*

**37. Is intercepting groundwater flow at this scale legal under state law?**

*See attached information provided by the applicant (Attachment A).*

**38. There is a large amount of water brought into the area by the Bodam lateral. Why is this feature not mentioned in the submitted Groundwater Reports? There is a junction box on the lateral at the southeast corner of the property where a 15 inch pipe diverts considerable flow to the northwest to feed the decorative pond. In the wetlands report the pond is described as being fed**

by the lateral from the north. The pond is fed by the lateral branch from the south and the pond's outlet runs north.

*See attached information provided by the applicant (Attachment A).*

**39. The Dry Creek #2 Ditch lateral rarely ever flows. How is this addressed in the recharge estimates in the Groundwater Reports?**

*See attached information provided by the applicant (Attachment A).*

**40. Through development, is the groundwater table typically lowered? What is the mechanism for this lowering?**

*See attached information provided by the applicant (Attachment A).*

**41. Are the bottom of the proposed drainage swales on site located below the measured high groundwater levels?**

*See attached information provided by the applicant (Attachment A).*

**42. In the 2012 groundwater report the leakage along dry creek ditch is quantified as follows: "The estimated leakage rate of 64.7 also corresponds well to the average rate used by the ditch company for estimating ditch leakage. When using the ditch company's leakage rate of 20%, and a flow rate equal to the piped ditch design capacity (28 gpm), the average leakage rate across the Project area is calculated to be approximately 51.5 gpm." How is this leakage rate applied? What is the actual flow along the ditch that the 20% is applied to?**

*See attached information provided by the applicant (Attachment A).*

**43. The 2012 Groundwater report provides well depth measurements through 5/9/2012. Did they take measurements after May 9th?**

*See attached information provided by the applicant (Attachment A).*

**44. Is the developer in negotiations with any property owners or the ditch company concerning current irrigation practices?**

*See attached information provided by the applicant (Attachment A).*

**45. In Appendix A of the May 2010 Groundwater Hydrology Monitoring & Wetland Delineation Report ditch flow measurements are reported for the west and east laterals. When converting from cubic feet/second to gallons/minute the conversion factor of 0.13368 was applied incorrectly. Instead of dividing by the conversion factor the CFS is multiplied by the conversion factor. In other words there are 7.5 gallons per cubic foot, not 1/7.5 gallons. Was this corrected?**

*See attached information provided by the applicant (Attachment A).*

**46. The developer is proposing to install an underdrain system for the homes immediately adjacent to the Bodam Lateral. In a general construction practice sense, why would underdrains be pursued at a location where the homes are on fill up to 5 feet thick without any basements?**

*See attached information provided by Anderson Consulting Engineers, the city contracted 4<sup>th</sup> party consultant (Attachment B).*

**47. Will moving groundwater to the north of the site exacerbate the sump pumping problems for the adjacent homes?**

*See attached information provided by Anderson Consulting Engineers, the city contracted 4<sup>th</sup> party consultant (Attachment B).*

**48. There is a large amount of water brought into the area by the Bodam ditch lateral. This water is specifically intended to recharge groundwater levels. In the 2 groundwater reports this feature is not mentioned. The 2012 report is based on the 2010 report. Does the 2012 report mischaracterize the irrigation hydrology and its recharge estimate?**

*See attached information provided by Anderson Consulting Engineers, the city contracted 4<sup>th</sup> party consultant (Attachment B).*

**49. Staff has claimed that in their experience developments tend to reduce groundwater levels. Considering that much of the groundwater on the site originates off-site and consists of lateral flow through the area what is the mechanism that will lower the groundwater levels?**

*See attached information provided by Anderson Consulting Engineers, the city contracted 4<sup>th</sup> party consultant (Attachment B).*

**50. How will groundwater levels be affected in a "wet" year? The developer has only measured groundwater levels in years that have received either an average amount of precipitation (approximately 17 inches per year) or a less than average amount of precipitation.**

*See attached information provided by Anderson Consulting Engineers, the city contracted 4<sup>th</sup> party consultant (Attachment B).*

**51. How much leakage can be expected from the Dry Creek Ditch #2 and is this leakage the cause of the sump pumping problems? In the 2012 report they come up with a leakage rate along the ditch of 64 GPM. They derive this number from the groundwater model. Is the estimated leakage rate accurate?**

*See attached information provided by Anderson Consulting Engineers, the city contracted 4<sup>th</sup> party consultant (Attachment B).*

**52. Do the reports submitted to date accurately describe the source of groundwater, its depth, how much it flows and its direction of flow?**

*See attached information provided by Anderson Consulting Engineers, the city contracted 4<sup>th</sup> party consultant (Attachment B).*

**53. The developer is proposing to pipe the Dry Creek Ditch #2 and also develop a flood conveyance channel along the west side of the property. This will require extensive excavation along the ditch corridor. Will excavation in this area and construction of the ditch pipe negatively affect groundwater flows?**

*See attached information provided by Anderson Consulting Engineers, the city contracted 4<sup>th</sup> party consultant (Attachment B).*

**54. The site plan shows some roads at the current grades. How will the road bed excavation, fill and compaction affect the groundwater flows? Conversely, how will the high groundwater levels affect the structural stability of the road way?**

*See attached information provided by Anderson Consulting Engineers, the city contracted 4<sup>th</sup> party consultant (Attachment B).*

**55. How will utility trenches impact groundwater?**

*See attached information provided by Anderson Consulting Engineers, the city contracted 4<sup>th</sup> party consultant (Attachment B).*

**56. How will the extensive fill dirt that will be brought onto the property affect groundwater flow?**

*See attached information provided by Anderson Consulting Engineers, the city contracted 4<sup>th</sup> party consultant (Attachment B).*

**57. The groundwater reports and conclusions are based on simulations of the groundwater. What other techniques make up industry standard best practices that allow one to understand groundwater hydrology in a development of this size? For example, dye tests to determine flow directions, pump tests to determine hydraulic conductivity, actual measurements of ditch flows to determine leakage rates.**

*See attached information provided by Anderson Consulting Engineers, the city contracted 4<sup>th</sup> party consultant (Attachment B).*

**58. To date the developer has presented the results from just 2 model-based evaluations of the groundwater hydrology. These models are based on a single parameterization of recharge rates and hydraulic conductivity. They do not provide error estimates, confidence intervals or any sensitivity analysis. Does this level of analysis follow normal industry standards for understanding groundwater hydrology and the impacts that development may bring to it?**

*See attached information provided by Anderson Consulting Engineers, the city contracted 4<sup>th</sup> party consultant (Attachment B).*

**59. The City does not have regulations that address groundwater. How is this addressed for the development site?**

*While it is true there are no current city regulations related to groundwater, the applicant completed a Groundwater Recharge Evaluation for the proposed development at staff's request. Recognizing that groundwater is an area of specialization, staff felt that it was extremely important to have an expert in this field review the information that was submitted. As you know, the city has contracted with a 3rd and 4th party consultants to review the data in advance of the Planning board hearing.*

**60. In Appendix A of the May 2010 Groundwater Hydrology Monitoring & Wetland Delineation Report ditch flow measurements are reported for the west and east laterals. Unfortunately when converting from cubic feet/second to gallons/minute a conversion error occurred.**

*The applicant has the following response:*

*"Mr. McWhirter cites an old and outdated report which was based on observations made nearly 5 years ago. For the record, the conversion error noted by Mr. McWhirter for the flows of the adjacent irrigation laterals do not change the wetland delineations presented in the older report. The irrigation flows were provided as supplemental information documenting that the irrigation lateral was flowing during the field observations made on the Boulder Creek Commons property."*

**Traffic**

**61. To accurately gauge impacts on Kewanee and Cimmaron, the proportion of the overall neighborhood traffic (other than Greenbelt Meadows) that will end up using the Kewanee cut-through should be quantified.**

*The applicant has the following response:*

*"The January 31, 2013 supplemental memorandum (Attachment C) included a section titled "Potential Change in Traffic Patterns Resulting from Site Development". This memorandum discussed the potential for some people to use Kewanee Drive between Greenbelt Meadows and Manhattan Middle School. Manhattan Middle School has a more regional draw than a typical neighborhood school so the amount of local traffic on 55<sup>th</sup> Street to/from the school along Kewanee Drive should be relatively low and concentrated at the morning and afternoon school peak hours. It also discussed the potential from some people living along Manhattan Drive to use Kewanee Drive between Manhattan Drive and East Boulder Community Park. It also discussed design features being proposed on Kewanee Drive within the site to help discourage through traffic. It is anticipated that 200 vehicles trips per day could use Kewanee Drive as a through street."*

**62. What is the affect of the additional cut-through traffic on the Kewanee/Manhattan and the Manhattan/Baseline intersections?**

*The applicant has the following response:*

*"The non-site traffic on Kewanee Drive is expected to be mostly redirected local traffic between Manhattan Drive and 55<sup>th</sup> Street and not to be used as a cut-through or short-cut between Baseline Road and S. Boulder Road. Examples would be Greenbelt Meadows residents driving to/from Manhattan Middle School and residents along Manhattan Drive driving to/from East Boulder Community Park. It is*

likely some of these redirected trips currently use Baseline Road or S. Boulder Road to travel between Manhattan Drive and 55<sup>th</sup> Street.

The levels of service (A through F) for intersections is typically determined based on the weekday morning and afternoon peak hours – the traffic study included a capacity analysis at several intersections including these two intersections for existing and 2032 conditions both with and without the addition of site traffic.

The Manhattan Drive/Kewanee Drive intersection is projected to operate at LOS “A” and “B” for all movements through 2032 with or without the addition of site traffic. This intersection can easily accommodate the addition of site traffic and a few hundred vehicles per day of redirected local traffic.

The Baseline Road/Manhattan Drive intersection northbound left-turn movement is expected to operate at LOS “D” through 2032 with or without the addition of site traffic. During the morning peak hour the addition of site traffic could increase delays for this movement by about one second per vehicle. During the afternoon peak hour the increase in delay is negligible. This was based on 35 percent of site traffic oriented north along Manhattan Drive. The supplemental memorandum increased this to 45 percent and determined the increase in delay would go from about 1.0 seconds per vehicle to about 1.6 seconds per vehicle and still be negligible in the afternoon peak hour. As mentioned above, the connection of Kewanee Drive as a through street between Manhattan Drive and 55<sup>th</sup> Street is expected to be used primarily by site traffic and redirected local traffic. The increase in delay at the intersection of Baseline Road/Manhattan Drive due to the redirection of local traffic is expected to be minimal and not require a change in the existing signal timings.”

**63. Is it important to have a daily average count on north Manhattan to determine the percent increase?**

Traffic counts are planned to be obtained by city staff on north Manhattan during the first week of April. This information will be made available as soon as possible.

**64. It has been observed that cars trying to make a left turn from Manhattan onto Baseline start to back up. In contacting city traffic engineers, they state that changing the timing on the light would affect at least six other traffic lights along the Baseline/Foothills corridor. Is this the case? How does the city plan to handle all the extra cars trying to make that left turn from Manhattan onto Baseline this development will add?**

If the level of service on Manhattan Drive at Baseline Road degrades in the future to an unacceptable level, city staff would reallocate traffic signal green time from Baseline to Manhattan to return Manhattan to an acceptable level of service while maintaining as high a level of service as possible on Baseline.

The applicant has the following response which was confirmed by city staff:

“The Baseline Road corridor traffic signals are coordinated to maximize east/west through traffic progression. Progression is a measure of the amount of time that a platoon of vehicles can pass through multiple intersections without encountering a right light. The intent of most jurisdictions including the City of Boulder is to maximize progression and level of service of major through corridors and operate lower classification side streets that intersect them at a lower but still acceptable level of service. The intersection of Baseline Road/Manhattan Drive is consistent with this strategy with the east/west

*through movements operating at LOS “A” or “B” through 2032 and the Manhattan Drive approaches operating at LOS “C” and “D” through 2032. The northbound left-turn movement is expected to operate at LOS “D” through 2032 with or without the addition of site traffic. The increase in northbound left-turn morning peak hour traffic is expected to be 9 vehicles per hour in the traffic study and 13 vehicles per hour in the supplemental memorandum. This relates to an average of one additional vehicle every 4 to 7 minutes. LSC does not recommend a change in the existing signal timings at any of the signalized intersections included in the study area.”*

**65. The applicant’s transportation engineer revised the trip distribution to change the 10% of site traffic that went west-bound on Baseline from 55th to use Kewanee. However, they still have 20% of site traffic using 55th north. They provide no explanation or rationale for this.**

*The applicant has the following response:*

*“Section E of the traffic study discusses the assumptions used to estimate the directional distribution. The directional distribution assumed 15 percent of site traffic would be oriented to 55<sup>th</sup> Street north of Baseline Road and 15 percent oriented east on Baseline Road (with 10 percent using Manhattan Drive and 5 percent using 55<sup>th</sup> Street). It assumed 35 percent would be oriented west on Baseline Road (with 25 percent using Manhattan Drive and 10 percent using 55<sup>th</sup> Street). This resulted in 35 percent to/from the north on Manhattan Drive and 30% to/from the north on 55<sup>th</sup> Street. The supplemental memorandum assumed all traffic oriented west on Baseline Road would use Manhattan Drive. This resulted in 45 percent to/from the north on Manhattan Drive and 20 percent to/from the north on 55<sup>th</sup> Street.”*

**Attachment A – Supplemental Information from the Applicant**

**Attachment B – Anderson Consulting Engineers, Inc. 4<sup>th</sup> Party City  
Contracted Review**

**Attachment C – LSC Transportation Consultants, Inc.  
Supplemental Memorandum to the December 20, 2012 Boulder  
Creek Commons Traffic Impact Analysis**