SANTOLINA LEVEL 'B' MASTER PLAN

LEVEL 'B' PLANNED COMMUNITY TECHNICAL REPORT

DRAINAGE (STORMWATER) MASTER PLAN AND TERRAIN MANAGEMENT PLAN

JANUARY 25, 2016

Prepared For:

Western Albuquerque Land Holdings, LLC
P.O. Box 56790
Albuquerque, NM 87187

Prepared By:

Bohannan Huston
Engineering
Spatial Data
Advanced Technologies

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TECHNICAL REPORT

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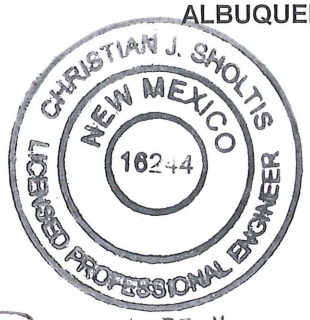
PREPARED FOR:

WESTERN ALBUQUERQUE LAND HOLDINGS, LLC (WALH)

PREPARED BY:

BOHANNAN HUSTON, INC.
7500 JEFFERSON ST NE
COURTYARD ONE
ALBUQUERQUE, NM 87109



Prepared By:

Christian J. Sholtis, P.E. Date 1-25-16

Reviewed By:

James Topmiller, P.E. Date

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I. INTRODUCTION

The Santolina Level 'B' Master Planned Community (Santolina) is a large scale master planned development within the previously approved Level 'A' area located south of Interstate 40 (I-40), and west of the Rio Grande River, in the County of Bernalillo, New Mexico.

The Santolina Planned Community Level 'B' Master Plan (the "Santolina Master Plan") consists of approximately 4,200 acres within the 13,700-acre Level 'A' area of land owned by Western Albuquerque Land Holdings (WALH). Santolina is located on the Southwest Mesa and is generally bounded by I-40 to the north, the Atrisco Terrace open space, Dennis Chaves Blvd on the south, and the natural escarpment separating this property from the Rio Puerco Valley on the west.

All of the lands in the Santolina Master Plan are located outside the municipal boundaries of the City of Albuquerque. Approved as part of the previous Level 'A' Master Plan submittal, the project site is zoned as Planned Community Zoning. In accordance with County process, future Level 'C' plans will be required before development of the property can occur. Those future plans will supply detailed development information and will refine or perhaps modify the guidelines of this conceptual master plan report.

The Santolina Level B Plan is envisioned to have more than 9,000 residential units at full build-out and a potential population of 23,178 residents.

The Santolina development provides opportunities for creative and innovative drainage management solutions given the uniqueness of the site. Santolina is expected to develop in a way that embraces naturalistic, context sensitive infrastructure engineering to create a sustainable community.

This report is a supplemental technical report to the "*Santolina Level 'B' Master Plan*" submitted to the County Planning Department, under Planned Community Criteria guidelines.

Planned Communities Criteria (PCC) Level 'B' guidelines call for the stormwater master plan to provide a *"conceptual drainage plan for management of watersheds and floodplains."*

The primary goal of this Level 'B' Stormwater Management Plan is to provide a development framework for future Level 'C' plans in Santolina. Specifically, major goals include:

- Provide conceptual guidance to future Level 'C' site development plan submittals within Santolina.

- Provide preliminary sizing and locations of backbone trunk drainage infrastructure needed to support future Level 'C' plans.
- Protect undeveloped and developed property, both onsite and downstream offsite, from flooding in the 100-year and smaller storm events.
- Provide sustainable engineering approaches for trunk and site-level infrastructure, for the control, conveyance, storage and discharge of stormwater.
- Improve water quality by the use of stormwater retention and detention facilities.
- Shallow groundwater recharge and landscaping passive irrigation by the use of water harvesting techniques.
- Provision of co-located recreational, open space and multi-purpose water storage opportunities.

A. METHODOLOGY

The Santolina development area was divided into appropriate drainage basins related to the existing topography and proposed land uses. In addition to the proposed land uses within the Level 'B' plan, the onsite project area analysis includes road rights-of-way, public open space, parks, and stormwater facilities. Hydrologic modeling was performed using the Soil Conservation Service (SCS) method within the HEC-HMS computer software. This is a deviation from the methodology used for the Level 'A' analysis which used AHYMO, and was done due to a progressive shift from AHYMO use toward HEC-HMS. The HEC-HMS model has been adopted or is in the process of being adopted by all local authorities responsible for design and management of storm water facilities including Bernalillo County, Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) and the Federal Emergency Management Agency (FEMA). Santolina falls within the jurisdictions of all of these agencies responsible for protection of the public and design of public drainage infrastructure.

PRECIPITATION. The 100-year, 24-hour storm event was selected as the design event to calculate all peak flows generated. The 100-year, 10-day or 24-hour storms were selected as the design events to calculate the runoff volume used to design retention/detention facilities throughout the site. Specifically, the 100-year, 24-hour storm event was used for detention calculations, while the 100-year, 10-day storm event was used for retention calculations. Rainfall values for the study were provided NOAA Atlas 14. Partial duration rainfall depths for the 100-year storm event are shown in Table 1 below.

Table 1 – Rainfall Data (NOAA-14)	
STORM DURATION	**DEPTH (IN) AT 100-YR RECURRENCE INTERVAL**
5 MIN	0.591
15 MIN	1.11
1 HR	1.86
2 HR	2.13
3 HR	2.20
6 HR	2.38
12 HR	2.52
1 DAY	2.79
2 DAY	2.97
4 DAY	3.47
7 DAY	3.88
10 DAY	4.39

LAND TREATMENTS AND CURVE NUMBERS. Land treatments related to the amount of pervious and impervious area within the developed watershed were assigned based on land treatments specified in the COA DPM and SCS Manual. Pervious SCS composite Curve Numbers were entered along with impervious percentages to calculate runoff in HEC-HMS. SCS Soil Group B was assumed for the hydrology model since the vast majority of Santolina (>90%) lies within this soil group. Table 2 shows land treatment percentages relative to land use type based on zoning categories.

Table 2 – Land Treatments by Land Use Category, Developed Condition		
	IMPERVIOUS %	**PERVIOUS CN**
Residential Single Family Detached (5 DU/AC)	49.5%	73
Residential Multi-Family (8 DU/AC)	60%	73
Residential High Density (20 DU/AC)	70%	73
Commercial/Business Park/Town Center	90%	73
Major Arterial Streets	90%	73
Industrial/Energy	70%	73

Open Space	0%	61
Schools	50%	73
Parks	7%	73
*Land treatment percentages specified by criteria in the City of Albuquerque's Development Process Manual (DPM)		

SEDIMENT BULKING. Sediment bulking parameters for the existing conditions were set forth in the Level 'A' DMP as established from the "*West I-40 Drainage Management Plan (DMP)*," prepared by Bohannan Huston on June 29, 2000 and are shown below in Table 3.

Table 3 – Bulking Factors

BASIN TYPE	100 - YEAR
EXISTING BASINS	2.5%
DEVELOPED BASINS	2.5%

II. EXISTING CONDITIONS

A. GENERAL

Currently, Santolina Level B Plan lies in a substantially undeveloped condition, used primarily for cattle grazing and related activities, with the land being vegetated by sparse grasses and shrubs. Please refer to **the Existing Conditions map**. Sporadic developed properties lie within or around Santolina, including an Air Force facility, the Tierra West manufactured home community and multiple small commercial developments along the I-40 South Frontage Road (Central Avenue extension).

These pre-Santolina developed properties generally release their flows at pre-development levels, or retain flows on their own lands. None of the properties are known to be damaging "single point (concentrated) flow" contributors to the historic drainage patterns.

B. ONSITE

The Stormwater Management Plan, Existing Conditions figure, graphically portrays the existing drainage basins and major flow paths that impact Santolina in today's primarily undeveloped condition. The tables on the figure further provide the information from hydrologic analysis of these basins.

CLOSED BASINS. Basins B-1 and C-1 located in the northwest portion of the site are located on a mesa top with escarpments located along the south, east and west boundaries and are closed basins in their existing condition, and runoff generated by these area is ponded and contained within the Santolina master plan area.

RIO PUERCO BASINS. A small portion of the site, existing onsite Basin A, discharges westerly into the Rio Puerco watershed.

BASINS DISCHARGING TO THE SOUTH. Existing Basins K-1 and K-2 free discharge southerly to the adjacent property (the Pajarito Grant lands). Eventually, most if not all of this drainage discharge flows eventually into the Rio Grande River in only the larger storm events.

BASINS DISCHARGING EASTERLY TO THE RIO GRANDE. The remaining basins, existing Basins G-1 and G-2, are conveyed easterly down the escarpment to the existing drainage facilities which discharge ultimately to the River. These facilities include the AMAFCA's Westgate Dam which then discharge into the Amole Channel owned and maintained by the City of Albuquerque.

C. OFFSITE

Offsite flows from Basins A, B and C north of I-40 impact the Level B master plan area.

III. DEVELOPED CONDITIONS

A. GENERAL

The Stormwater Management Plan, Developed Conditions figure graphically portrays the proposed stormwater management guidelines for the Santolina master planned community. In a sustainable and ecologically beneficial manner, the plan provides for continuation of the existing and historic stormwater characteristics of the Santolina property, including:

- Continued **onsite retention of 'developed condition' stormwater**, as generated in the existing closed basins.
- Continued **discharge of 'developed condition' stormwater to the south** (Pajarito Land Grants), but at historic flow rates (or less) and frequencies. Developed flows from the Level 'B' area will be captured by temporary stormwater detention facilities located just south of the Level 'B' area (within Level 'A' area), thereby restricting developed flow from the Santolina site to that of existing.

- Continued **discharge of 'developed condition' stormwater to the Rio Grande or Rio Puerco**, from the escarpment areas, via historic flow paths and existing drainage facilities, but at historic flow rates (or less) and frequencies.

The Developed Conditions figure shows the basins, drainage conveyances, detention and retention facilities proposed for the fully developed condition of Santolina Level B Plan. The tables further show the data inputs used for watershed modeling and the resulting runoff rates and volumes generated by the 100-yr frequency storm.

In compliance with this master plan, it is anticipated that all future Level 'C' site development plans will provide unique stormwater solutions that meet the Level 'A' and Level 'B' goals of sustainable and ecological development. To this end, where practical, future development plans in Santolina are guided wherever practical toward the drainage goals and criteria of Low Impact (or Light Imprint) Development (LID). This design concept includes:

- Water Harvesting
- Engineered Natural Drainage Conveyances
- Engineered Naturalistic Drainage Storage
- Water Quality

Water harvesting techniques shall be utilized where practical throughout Santolina, particularly in the non-single family residential land uses. On a site by site basis, rainwater harvesting approaches should be employed and capable of storing runoff volumes typically from the 2-year, 24-hour storm event (approximately 0.5"-1" of initial rainfall). Water harvesting techniques include small shallow ponds, swales or depressions in the site landscaping, cisterns, generally adjacent to developed site areas (i.e., parking lots, park areas, etc.), and more. High density urban development should be considered for reduced or modified application of these water harvesting principles to reflect development constraints.

Water harvesting will act as a "water clarifier" by removing suspended solids (often floatable debris), prior to being transported to the major stormwater systems within Santolina and ultimately the River. Water shall pass through ponds or swales at rates slow enough to drop out silt and sediment. This strategy treats the early site runoff that carries higher concentrations of pollutants. Ponding or slowing down stormwater onsite from these smaller higher frequency storm events also permits beneficial use by landscape, wildlife and native vegetation, while allowing the water to infiltrate the soil. Larger storm events are allowed to

pass through or around these ponds and be conveyed downstream by appropriate public drainage facilities.

OPEN SPACE. Designated 'open space' areas on the land use master plan will be largely undisturbed lands. Minor passive uses will be permitted in a manner that does not contribute to erosion or excessive concentrated runoff.

FEMA FLOODPLAINS. As shown on the Floodplains figure, several Federal Emergency Management Agency (FEMA) floodplains exist on Santolina.

B. STORMWATER MANAGEMENT PLAN

The following section presents the drainage planning, volumes and flowrates for the development of the Level B Plan area. Please refer to the Developed/Infrastructure Conditions exhibits, 2025 and Full Build.

BASIN B-1 AND C-1: DRAINAGE MANAGEMENT WITHIN CLOSED BASINS

Santolina Level B lands that are contained within existing 'closed basins' boundaries will have their developed runoff conveyed to **Interim Retention facilities**. Basins B-1 (Industrial Park) and C-1 (Business Park) are located within the 'closed basins' boundary area. The Interim Retention facilities are located in sites designated ultimately for 'permanent retention facilities', in keeping with historic drainage patterns and in accordance with the Level A master plan. However, since the sites are not located in proposed Level B development area and insufficient information (for final design guidance) is available today about the future ponding and open space configurations that would surround the ponds, the permanent pond facility is not proposed to be constructed with Level B.

Instead of the permanent facilities, 'interim retention' facilities, i.e., Pond B and Pond C, are planned that will retain the stormwater volumes produced by undeveloped and developed contributing basins that today drain to the existing depression zones located at these Ponds. In **the desired Low Impact Development (LID) manner**, i.e., mimicking the natural pre-development condition, other than evaporation and natural infiltration into the soil, there is no designed discharge from these retention facilities. The existing depression sites (Pond B and Pond C retention facilities) will collect the drainage flows via natural overland flow or via planned drainage systems discharging from the developed areas. Where sufficient natural storage volume is present in the existing depression basins, such as the case in Interim Retention facilities (ponds) Basins B and C, no additional grading or construction effort is proposed.

This concept (no discharge to River) is similar to that employed by the Mesa del Sol community and permitted by the State Engineer's Office, and was previously approved in the Level 'A' DMP.

Within the Industrial Park and the Business Park, onsite public drainage systems will be placed within road right-of-ways and necessary public easements (on private lands). The exhibits show conceptual infrastructure approaches to serving the Parks. Upon the development of specific business park site plans, the drainage infrastructure will be defined in clearer detail, with appropriate supporting hydrologic and hydraulic studies.

Existing **offsite flows**, generally from existing developed and undeveloped properties to the north but still south of I-40 (I-40 Properties), impacting the Level B Plan property, will be accepted by Level B Plan property as Santolina builds out. However, upon development or re-development of the I-40 Properties, it is required that the properties 'detain' developed drainage rates onsite and discharge at historic rates. Santolina properties will develop site drainage plans that will accept upstream offsite flows in one strategic location and pass these flows downstream. Actual circumstances at the time of development may require alternative concepts to be employed, and these will be evaluated by County staff. Flows from the Offsite Basins A, B and C, north of I-40, will be retained in 'interim retention' ponds until such time as development plans are available for that area. These ponds will be constructed with Level B development, however, they may be phased such that construction is not required until actual development in the Industrial and Business Parks reaches a point where existing drainage flowpaths are impacted. Since these lands of these offsite Ponds are also owned by the developer of Santolina, appropriate easements and construction permits can be obtained when required.

BASIN K: DRAINAGE MANAGEMENT IN BASINS DISCHARGING SOUTH.

Runoff from the developed Level B Plan mesa top basins, that are planned to discharge to adjacent WALH lands south of the Level B Plan area (south of Dennis Chaves), shall be managed by providing an Interim Retention facility (Pond K) just south of the Level 'B' area to control runoff departing from Santolina. The Developed Conditions/Infrastructure figures identify the several large K-basins that discharge in a southerly manner.

Pond K is an existing natural depression location, suitable for storing stormwater generated by the Level B development area and adjacent undeveloped basins. Since its upstream basins generate approximately 408 acre feet of stormwater volume in the 10-day storm event, the existing storage volume of the depression (176 acre feet) will need to be

enhanced by construction of an engineered earthen berm on the south side, within WALH property.

Please refer to Developed Conditions figure for tables which identify the volume requirements of the 'retention facilities' and basin flows and volumes.

Internal Level B Plan detention drainage facilities (see Infrastructure maps) will be designed for the 100-year, 24-hour storm event and will generally consist of:

- Water harvesting and stormwater quality features
- Large deep earthen lined (and often landscaped) ponds
- Mild sides of typically 3:1 maximum slopes
- Aesthetically designed piping system inlets (with water quality and energy dissipation features)
- Infiltration basins to minimize/eliminate standing water
- Recreational and open space opportunities
- Naturalistic engineering design (grading, contoured edges, etc.)
- Multi-purpose water storage capability
- Minimal sediment storage, as appropriate

The detention facilities are generally recommended to be placed in and coordinated with large, open space areas and parks, and may also include other active and passive recreational uses, such as playgrounds, benches, trails and sports fields. Due to the relatively even terrain of Santolina and the large size requirements of these retention facilities, it is probable that final design of the facilities will incorporate a series of smaller, connected retention facilities which, from a total volume standpoint, serve as one large ponding facility.

BASIN G: DRAINAGE MANAGEMENT IN BASINS DISCHARGING OFF THE EAST ESCARPMENT TO THE RIO GRANDE

Stormwater runoff from a developed Santolina Level B impacts both escarpments and both river systems (Rio Grande and Rio Puerco). The site drainage basin discharging to the westerly Rio Puerco escarpment is proposed for open space in the land use master plan. Accordingly, no stormwater facilities are proposed for this minimally impacted escarpment area.

Runoff from Santolina's mesa top area that discharges off the easterly escarpment will eventually drain to the Rio Grande River. Stormwater runoff draining easterly will be managed by both existing (Westgate Dam) and proposed drainage facilities. The Proposed

Conditions/Infrastructure figures show proposed stormwater conveyance facilities and detention dams for the Santolina Level B Plan development.

Of particular note for the easterly escarpment is the incised Amole Arroyo system. Both the east and west branches of this large arroyo cut deeply through the easterly escarpment, and into the Level B Plan area. Both arroyo branches are natural arroyos for most of their lengths, but are affected in minor ways by existing development drainage discharges in their drainage basins. The arroyos drain to the AMAFCA Westgate Dam facility, an existing dam located at the east boundary of Santolina. The dam is further described in a following section. With development of Santolina, due to the greater and more frequent drainage flows, sandy bottom arroyo conditions and steep hydraulic slopes, it is anticipated that the existing natural arroyos will needed to be improved in order to avoid severe erosive impacts. If required in order to accommodate specific development proposals within the large Level B Plan area, naturalistic design measures should be employed, including the use of tinted concrete, soil cement, side-only embankments with soft (sandy) bottom, drop structure methods and other light impact techniques.

It is anticipated and necessary that future more specific 'C' development submittals will refine this Level B conceptual view to more specific stormwater management proposals.

FLOODPLAINS AND ARROYO DISTURBANCE

Existing FEMA floodplains exist across the Level B Plan area. As development approaches these floodplains, appropriate steps to eliminate, reduce or relocate the floodplains may be necessary. As this floodplain modification process is currently a long process, it is advised that adequate planning in advance of development occur to avoid project delays.

Development impacts to existing defined arroyos may also be required to process 404 permits with the Corps of Engineers.

WESTGATE DAM

AMAFCA's Westgate Dam facility lies adjacent to the Santolina master plan boundary. It is an existing earthen dam facility, providing an inflow volume of 347 acre feet, and accepts an estimated 2418 cfs inflow in the large storm event, and discharges 80 cfs through its principal spillway outlet structure. With the diversion of flows north of I-40, as stated in the "*West I-40 Drainage Management Plan (DMP) Update*," the drainage basin area that discharges into the Westgate Dam has been significantly decreased and the Dam may hold

excess capacity at this time. The Developed Conditions and Infrastructure figures reflect only a minor increase in basin area (over the Existing Conditions) discharging to Westgate Dam.

The Dam is currently under study by AMAFCA, and the results of this study are not yet published by AMAFCA. Accordingly, future submittals of Level 'C' site development plans may find opportunity to increase the extent of developed basins that drain to the Westgate Dam. The Dam may be considered for additional uses, such as recreational or water quality purposes, with AMAFCA approvals.

Due to the steeper terrain in the westerly Westgate Dam basins and an anticipated significant amount of existing and proposed flow, "engineered natural arroyos" (partially improved arroyo cross-sections, such as soft bottom, meandering systems) and/or buried large diameter pipe, or similar, may be essential to safely and non-destructively convey flows within the AMOLE arroyo leading to Westgate Dam. Final recommendation for drainage management facilities within the Westgate Dams shall be refined in greater detail in the future Drainage Management Plans (DMP's) that are directly related to specific development proposals.

The "*Amole-Hubbell Drainage Management Plan"* is currently being updated by AMAFCA to compile all modifications within the plan area, such as the addition of the Borrega Dam and other improvements. As development occurs within this area, drainage management design shall comply with the updated "*Amole-Hubbell Drainage Management Plan*", or modify this plan with AMAFCA approvals.

C. TERRAIN MANAGEMENT PLAN

Terrain management planning in the Santolina Level B master plan is intended to mitigate the effects of stormwater runoff, dust generation, soil erosion (water and wind), and other natural habitat loss that could otherwise result from new development. This goal applies to both newly developed areas and existing undisturbed natural terrain within the Santolina Level B development. The primary elements of terrain management, generally applied at the time of site development, include:

- **Low Impact Development (LID) practices**, which seek to mimic natural rainwater systems to reduce runoff volume, increase infiltration and filtration, and modulate the rate of runoff from a site.
- **Stormwater quality enhancement and protection**,

- **Municipal Separate Storm Sewer System (MS4) compliance**

Often these systems are combined in various manners to achieve a more comprehensive and effective site solution. Further, these systems are generally required to be applied in a site-specific manner. This means that *not all of the elements and approaches listed below are applicable to every site.* A careful consideration of each proposed development site's unique characteristics will guide both the designer and agency reviewer to the appropriate final measures.

Low Impact Development (LID)

Santolina Level B shall require that the following site development LID measures (or similar), be considered, addressed and, where applicable and practical, implemented in all Level C development submittals:

- Phased site grading requirements that practically minimize the extent of open grading operations at any one time and match grading operations to the actual pace of development.
- Site grading plans that minimize the amount and depth of grading 'cuts' on the site (ie, seek to work with the natural site terrain, where practical).
- Revegetation of all disturbed areas, including longer term maintenance of the revegetated land surfaces.
- Construction practices, such as regular dirt wetting and compaction practices, that minimize the area of disturbance and control erosion and blowing dust.
- Protection of steeper slopes within developed areas thru proper landscape design and treatment.
- Protection of undeveloped steeper slopes within open space areas with attention paid to promoting native growth if appropriate, as well as design of trails through open spaces with slope and native vegetation protection in mind, and prohibition of off-road vehicle travel (except for construction activity, emergencies, operation and maintenance needs).
- LID and traditional engineered solutions will generally need to be combined to achieve all of the objectives of stormwater management, such as light impact and flood control goals.

- Where discharge of runoff is to existing natural arroyos, extreme care in design will be required to reduce bottom and side erosion, headcutting and aesthetic damage. Available techniques include runoff dispersion, distributed subsurface storage, energy dissipation solutions, connections at the flowline of the receiving natural arroyo, check structures along the arroyo, etc. Consider 'induced meandering' of existing natural arroyo systems when these arroyos will receive developed site runoff. This technique will reduce headcutting and severe erosion.
- Encourage builders to employ best practices in the manner described above.

The above measures are intended especially to manage and reduce wind and water erosion across Santolina Level B Plan area.

Stormwater Quality Enhancement and Protection

New development sites shall be required to manage the first flush of storm events. The 'first flush' is the stormwater runoff from small storm events and the first stages of runoff from larger storms. The first flush volume is generally defined as the runoff from 0.44-inch storm. Since there will be little to no runoff from pervious areas with a 0.44-inch storm or less, only runoff from impervious areas is considered in the required treatment volume.

In addition to LID sitework techniques, **stormwater quality enhancement and/or protection practices** will be required in Santolina Level B to manage the 'first flush' of storm events. Typical such site design practices may include:

- Compact site design which strives to reduce the scale and extent of impervious areas (i.e. reduce rooftops, parking lots, roads, etc.).
- Water harvesting, through infiltration of stormwater using pervious swales, pervious pavements, "green" roofs, subsurface stormwater detention/infiltration, and/or rain gardens Depressed parking islands with curb cut(s), depressed landscape/bio-retention areas, bioswale and biofilters, landscape conveyances, infiltration trench.
- Site paving, pedestrian and trails, may include such measures as pervious pavers, open-cell structures with gravel, pervious concrete or asphalt, gravel parking lots, underground cisterns, planter boxes, etc.

- Adequate landscape/open space buffers between developed areas, to capture the first flush.
- Limit modifications and disturbance to natural drainageways.
- Common site planning guidelines and practices which address stormwater quality and may be employed at Santolina Level B are as follows (from local regulations):
- Take advantage of the entire site when planning for stormwater treatment. Spreading the runoff over a larger portion of the site can help to reduce less desirable treatment strategies that rely on underground capture and deep basins that can be difficult to maintain.
- Reduce runoff to the maximum extent practicable to more closely match natural conditions. Drain impervious areas to landscape areas and minimize directly connected impervious areas. Reduce the amount of impervious areas (e.g. use porous pavement or gravel for low-use or emergency access) and select treatment techniques that promote infiltration.
- Integrate stormwater quality management and flood control, when practical. If the site is to detain runoff for flood control purposes, the facility used for flood control can be modified for stormwater quality by raising the overflow elevation above the first flush volume.
- Landscape stormwater management facilities. A stormwater management facility can be an attractive addition to the site, rather than just a dirt area. In addition, landscaping will minimize the potential for erosion and therefore minimize the amount of required maintenance.
- Consider surface conveyance as an alternative to pipes.
- Design facilities for easier maintenance. Fine soils may clog void spaces in with time. The designer should consider a capture area for fine soils where stormwater enters the facility that can be easily replaced or maintained.
- Amend the soil to allow for improved infiltration.

Municipal Separate Storm Sewer System (MS4)

Protection of the Rio Grande and improving our storm water quality is of paramount importance to the County of Bernalillo.

MS4 permit requirements generally include the following: (1) Find and eliminate non-storm water discharges that are sources of pollution that are harmful to the Rio Grande habitat, (2) monitor and minimize the release of pollutants, sediment, trash, and debris from construction sites during construction activities, (3) implement LID practices in an effort to reduce the amount of storm water runoff that can leave a site and enter the County/AMAFCA/City storm drainage systems, (4) ensure that storm water controls are maintained and inspected on a regular basis.

As requested in the Level A conditions of approval, Santolina Level B commits to conformance with EPA-issued MS4 permit provisions or requirements that may be issued for the County of Bernalillo urbanized area.

Effective strategies for Stormwater Treatment

There is a variety of Best Management Practices (BMPs) to improve stormwater quality. Not all BMPs are appropriate for all development types. See Table 22.13.1 for development types.

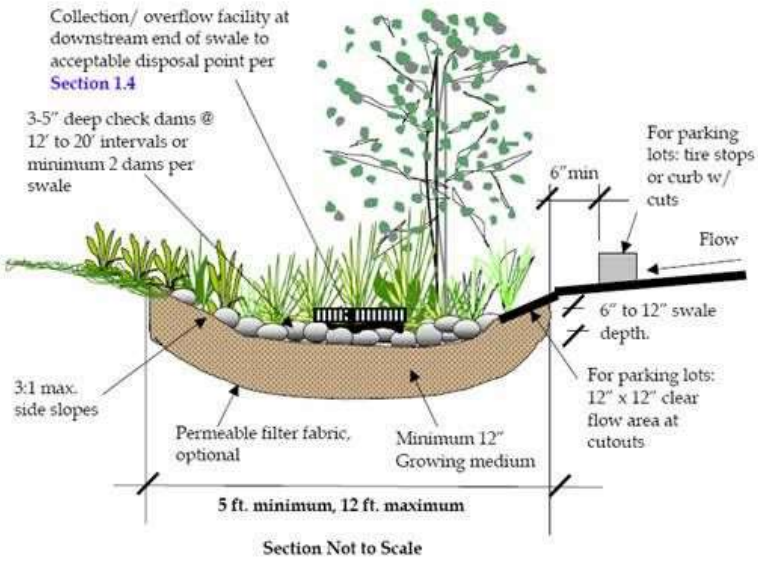
Table 4 - Development Types

Development Type	Percentage Landscaping	Percentage Parking/Paving	Building Footprint	Parking
Dense Urban	0-5%	0-5%	90-100%	Structure On-street
High Density Mixed Use	0-10%	0-15%	80-90%	Structure Surface On-street
Commercial/Industrial	5-15%	40-60%	25-50%	Surface
Low Density Mixed Use	10-25%	30-50%	25-60%	Surface
Residential	30-70%	5-20%	30-70%	Surface
Educational/ Institutional	15-60%	10-25%	25-60%	Surface
Parks/Open Space	80-95%	5-15%	0-10%	Surface

*Landscaping, parking and FAR as determined by Zoning requirements

The following structural BMPS can be used to improve stormwater quality:

A. Landscape Category:
Depressed parking islands with curb cut(s)



Depressed landscape/bioretention areas
Bioswale/biofilter
Landscape conveyance
Infiltration trench

B. Paving Category:
Pervious pavers
Open-cell structure with gravel
Pervious concrete or asphalt
Gravel parking lots
Underground cisterns

C. Elevated category:
Planter boxes
Cisterns
Green/brown roofs

D. Streetscape Category:
Landscape area between sidewalk and curb
Street medians

E. Flood Control Category:
Flood control facility with elevated overflow
Water quality structure to capture floatables and debris

F. Offsite Mitigation Category:
Constructing stormwater quality improvements outside the project boundaries
Payment-in-Lieu option-meet thresholds per permit

Note: The above section taken from City of Albuquerque draft DPM section.

IV. OPERATION AND MAINTENANCE

The stormwater infrastructure of Santolina will primarily consist of several major elements that will require maintenance and operational management attention:

- The 'closed basin' retention ponding system, including the retention ponds, landscaping, recreational uses, water quality and infiltration devices.
- The detention ponding system, including the detention ponds, embankments, landscaping, recreational uses, water quality and infiltration devices, and required right-of-way.
- The public stormwater infrastructure system, including the underground drainage pipes and open channels (with appurtenances) street drainage infrastructure, landscaping, recreational uses, and required right-of-way.

The County of Bernalillo is anticipated to manage the public stormwater infrastructure and closed basin ponding systems. These systems will serve large areas of the community and will be located in public right-of-way and are suitable, therefore, for public ownership, operation and maintenance. The County will oversee the studies, design and construction of these facilities.

It is anticipated that AMAFCA will own, operate and maintain the large detention dams proposed in south and east discharging basins of Santolina, and also the major channel conveyances. AMAFCA will therefore oversee the studies, design and construction of these facilities. Westgate Dam will continue to be an active AMAFCA facility.

A maintenance agreement or covenant may be required with the County and AMAFCA for all drainage facilities and infrastructure that are proposed to allow other secondary uses, including landscaping, parks, playgrounds, sports fields, trails, etc. The agreement would define operational and maintenance responsibilities for all elements anticipated within the facility. Generally, only the strictly drainage-related aspects of the facilities will be maintained by the County or AMAFCA.

Future Level 'C' final design of the integrated stormwater system is required to refine the drainage management concepts and jurisdictional elements.

V. PHASING

The project shall be developed in multiple phases at such times, location and size as determined by market demand or the Owner(s) and developer(s). The project Infrastructure improvements shall be installed in phases on an as needed basis and sized to serve the phase of the project proposed and/or being developed.

Conceptually, the 2025 and 2040 Full Build stormwater system exhibits portray the proposed phasing at those two years of stormwater system infrastructure.

VI. SUMMARY

Stormwater management master planning within the Santolina Master Planned Community reveals the opportunity for uniquely engineered naturalistic systems that address water harvesting, water quality enhancement, mitigation of erosion potential, recreational and open space opportunities and beneficial use of storm water for wildlife, open space and native vegetation.

Santolina strives to preserve the pre-development hydrologic history and to integrate natural drainage approaches into a modern sustainable community environment in the developed condition.

This technical report is provided in support of the Level 'B' master plan submitted to County of Bernalillo Planning Department. It establishes a Level 'B' master plan framework for the management of storm runoff within Santolina. Future Level 'C' site development plans will refine this conceptual level framework to best fit the more detailed site development plans and subdivisions of future County submittals.

FIGURES

FIGURE 1 – PROPOSED LAND USE PLANS (FULL BUILD AND 2025)

FIGURE 2 – EXISTING CONDITIONS BASIN MAP

FIGURE 3 – FULLY DEVELOPED CONDITIONS BASIN MAP

FIGURE 4 – 2025 DEVELOPED CONDITIONS BASIN MAP

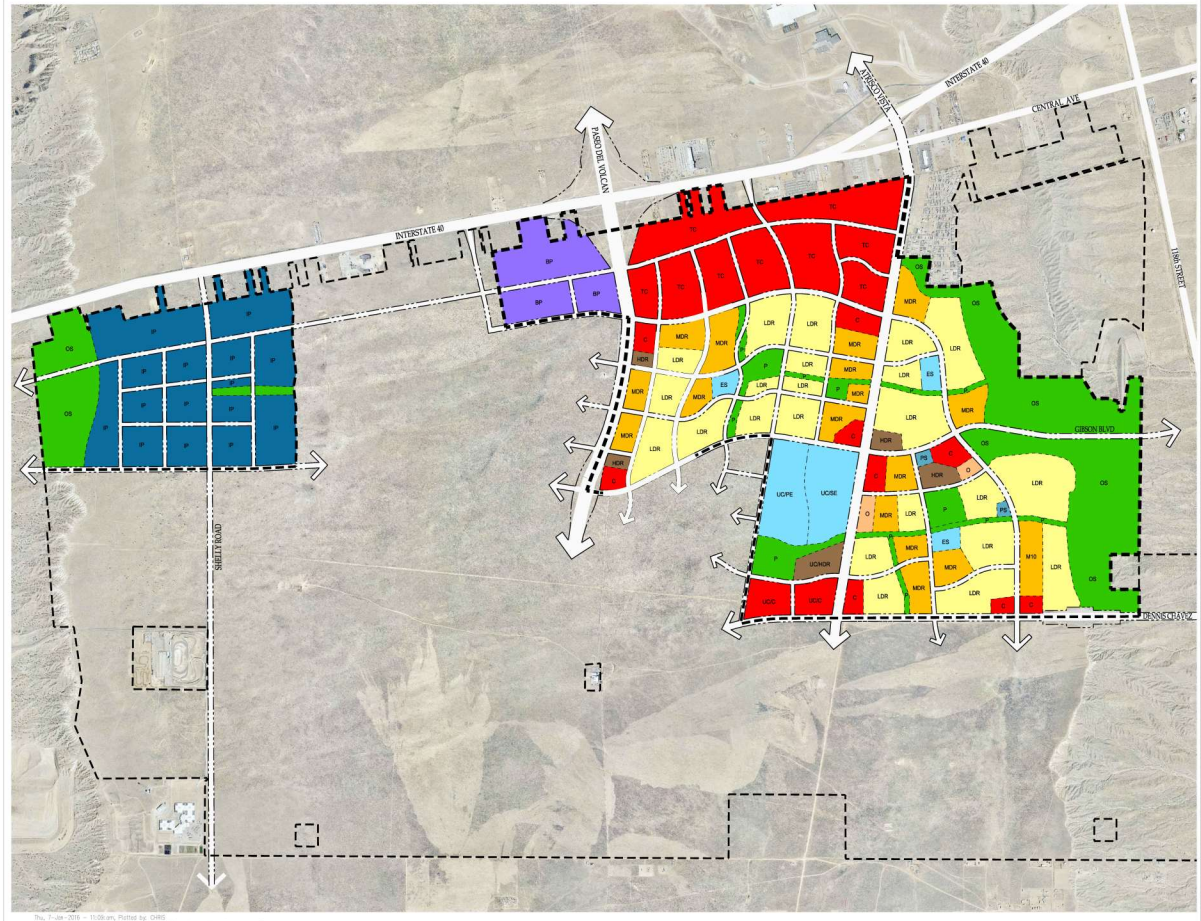
FIGURE 5 – FULLY DEVELOPED STORM DRAINAGE BACKBONE INFRASTRUCTURE

FIGURE 6 – 2025 STORM DRAINAGE BACKBONE INFRASTRUCTURE

FIGURE 7 - FLOODPLAINS

FIGURE 1 –
PROPOSED LAND USE PLANS (FULL BUILD AND 2025)

Bohannan Huston



SANTOLINA

LEVEL B

LEGEND

Land Use

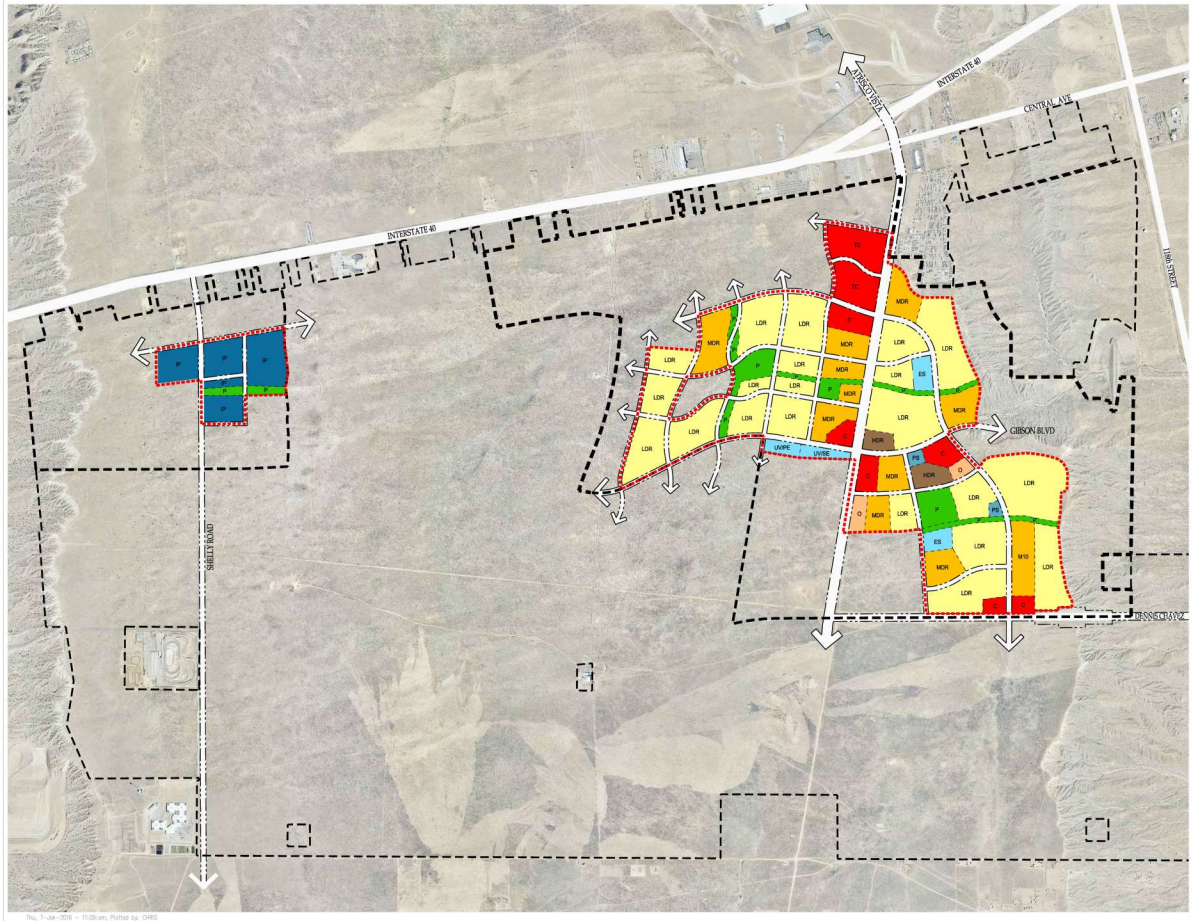
LDR	Low Density Residential
MDR	Medium Density Residential
HDR	High Density Residential
ES	Elementary School
UC/PE	Urban Center/ Primary Education Campus
UC/SE	Urban Center/ Secondary Education Campus
PS	Public Safety Facility
C	Commercial
TC	Town Center
UC/HDR	Urban Center/ High Density Residential
UC/C	Urban Center/ Commercial
O	Office
BP	Business Park
IP	Industrial and Business Park
P	Parks and Internal Open Space
OS	Open Space (Escarpment)
	Level B Boundary

40 acres
10 acres

NORTH 1/8 mile 0 1/4 mile 1/2 mile

LAND USE PLAN

exhibit xx



SANTOLINA

LEVEL B

LEGEND

Land Use

LDR	Low Density Residential
MDR	Medium Density Residential
HDR	High Density Residential
ES	Elementary School
UV/PE	Urban Village/ Primary Education Campus
UV/SE	Urban Village/ Secondary Education Campus
PS	Public Safety Facility
C	Commercial
TC	Town Center
O	Office
EP	Energy Park
P	Parks and Internal Open Space
OS	Open Space (Escarpment)
	Level B Boundary
	Level B 2025 Boundary

40 acres
10 acres

NORTH

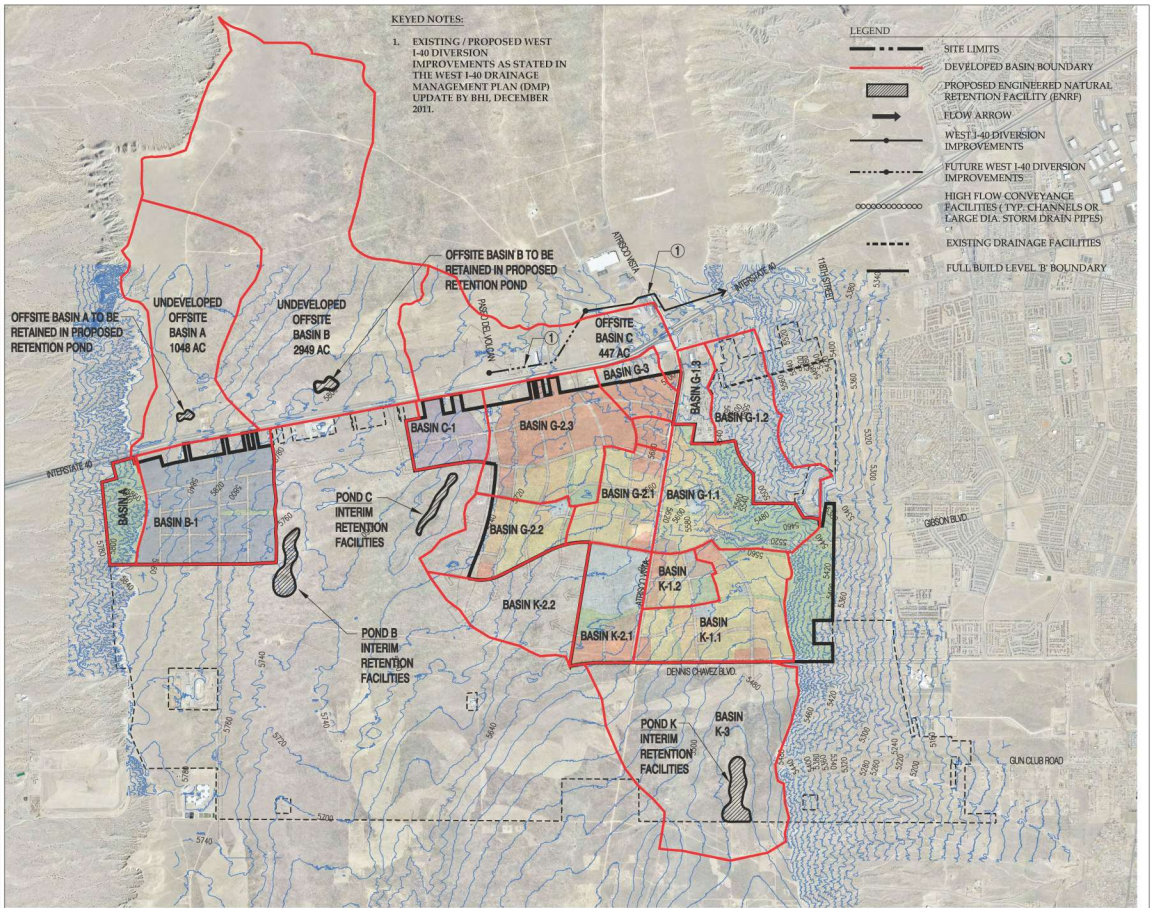
1/8 mile 0 1/4 mile 1/2 mile

2025 LAND USE PLAN

exhibit xx

FIGURE 2 –
EXISTING CONDITIONS BASIN MAP

Bohannan Huston



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SANTOLINA

LEVEL B

BASIN SUMMARY					
BASIN	Area (AC)	AREA (SQ.MI)	24 hr Q_P (CFS)	24 hr VOLUME (AC-FT)	10 DAY VOLUME (AC-FT)
Subbasin-A	166.2	0.2597	54.4	4.1	14.5
Subbasin-B-1	764.4	1.1944	142.2	18.7	66.4
Subbasin-C-1	248.0	0.3875	54.5	6.1	21.6
Subbasin-G-1.1	575.7	0.8995	117.3	14.1	50.0
Subbasin-G-1.2	482.6	0.7541	182.4	19.4	51.7
Subbasin-G-1.3	182.6	0.2853	652.3	30.6	52.4
Subbasin-G-2.1	357.7	0.5589	88.6	8.8	31.1
Subbasin-G-2.2	385.7	0.6027	80.5	9.5	33.5
Subbasin-G-2.3	731.6	1.1431	291.5	31.8	82.4
Subbasin-G-3	224.6	0.3509	237.4	17.2	35.4
Subbasin-K-1.1	596.2	0.9316	121.5	14.6	51.8
Subbasin-K-1.2	162.6	0.2541	38.9	4.0	14.1
Subbasin-K-2.1	313.0	0.4891	72.8	7.7	27.2
Subbasin-K-2.2	483.6	0.7556	86.3	11.8	42.0
Subbasin-K-3	1459.2	2.3	271.5	35.7	126.7
OFFSITE A	1048.0		511.0	39.3	139.1
OFFSITE B	2949.0		2113.0	110.6	391.5
OFFSITE C	834.0		986.0	56.8	201.1

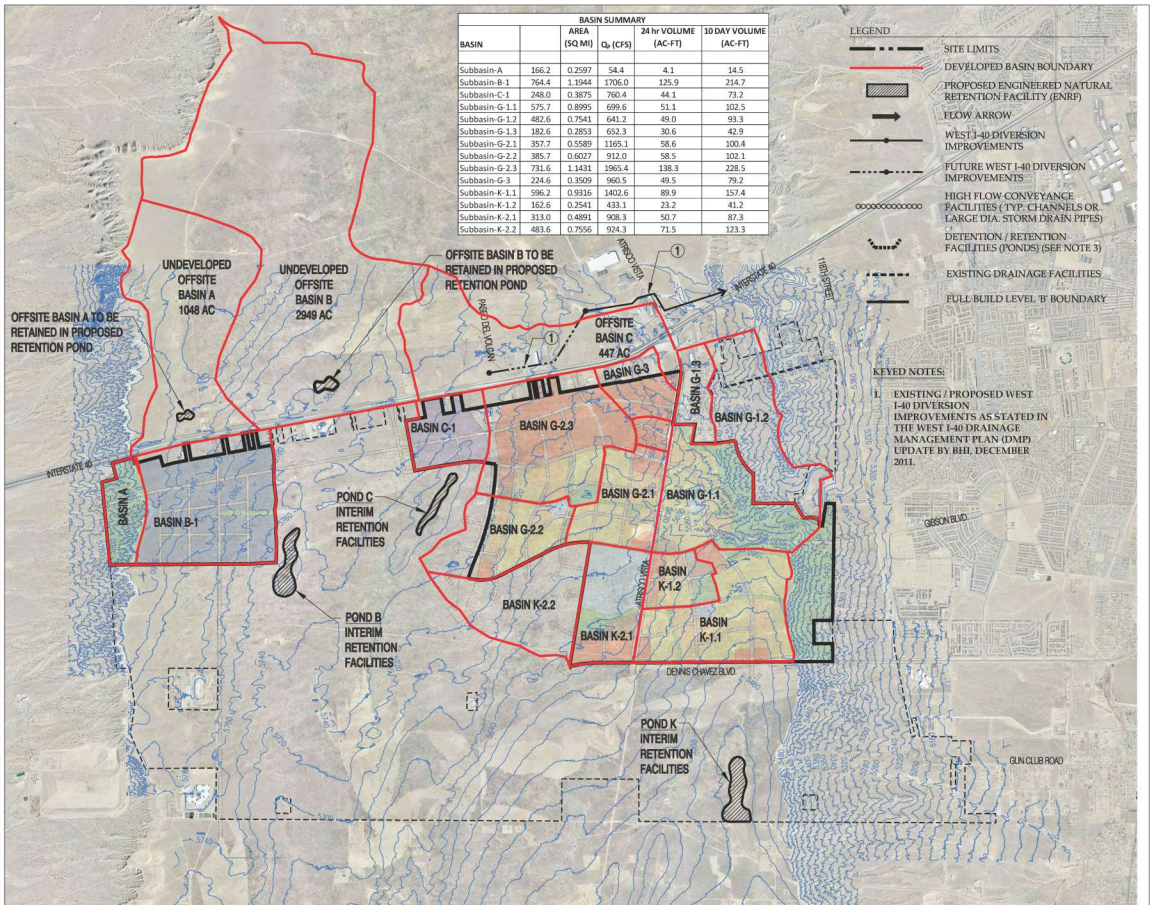
EXISTING DEPRESSION SUMMARY	
DEPRESSION	AVAIL STORAGE VOLUME (AC-FT)
B	1007.9
C	1727.0
K	176.2

NORTH 1000 0 2000 4000

EXISTING CONDITIONS

FIGURE 3 –

FULLY DEVELOPED CONDITIONS BASIN MAP



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SANTOLINA

LEVEL B

NOTES:

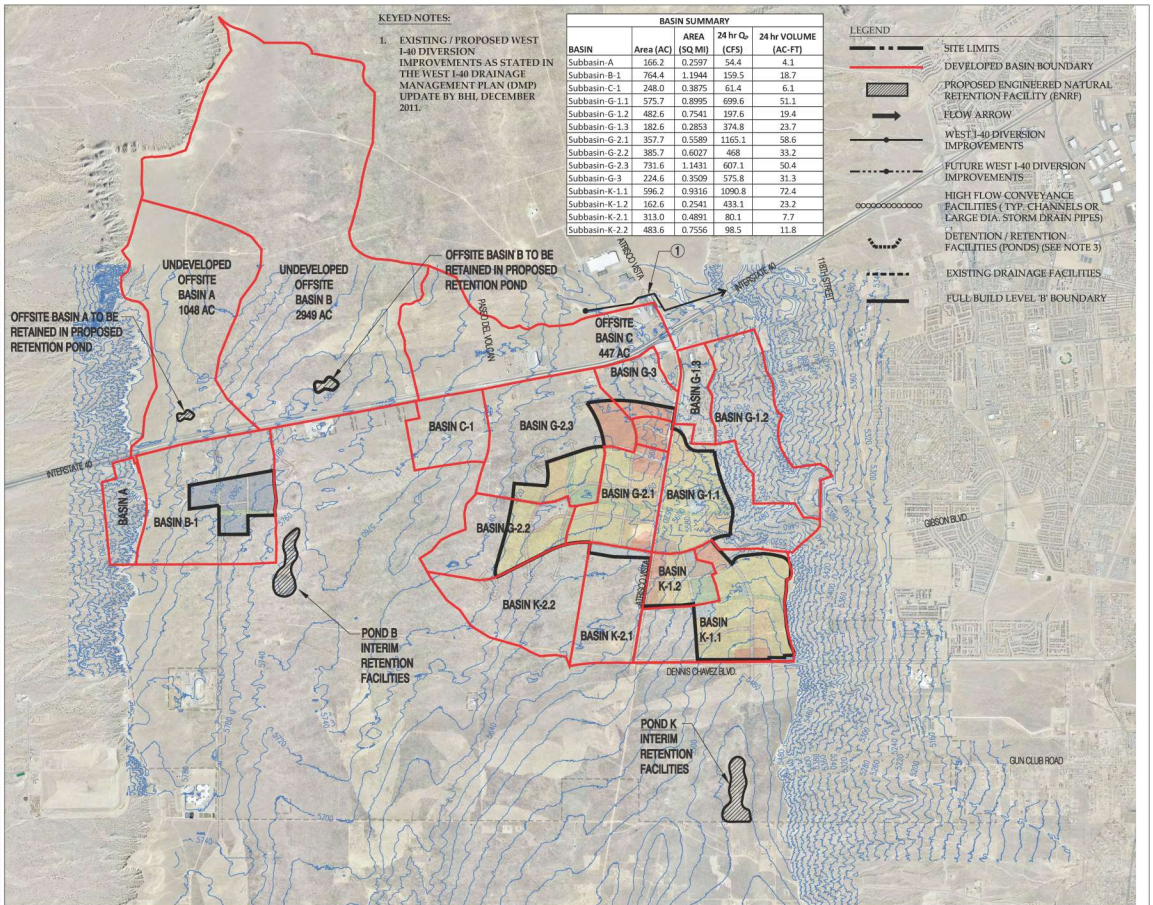
1. WITH DEVELOPMENT OF BASINS B AND C, FLOW ACROSS I40 FROM OFFSITE BASINS A AND B WILL BE CUT OFF AND RETAINED UPSTREAM OF I40 (IE, WITHIN THE OFFSITE BASINS RESPECTIVELY)
2. STORMWATER FACILITIES ARE APPROXIMATE AND ILLUSTRATIVE, SUBJECT TO CHANGE
3. THE DETENTION / RETENTION FACILITIES AND HIGH FLOW CONVEYANCE FACILITIES ARE ILLUSTRATIVE ONLY. FUTURE LEVEL "C" DESIGN REPORTS WILL REFINE THE DRAINAGE CONCEPTS FURTHER
4. CONVEYANCE FACILITIES (SUCH AS ABOVE GROUND CHANNELS) WILL BE DESIGNED AS ENGINEERED NATURAL ARROYOS WITH MULTI PURPOSE USES, WHERE PRACTICAL.

FULLY DEVELOPED CONDITIONS BASIN MAP (FULL BUILD 2040)

FIGURE 4 –

2025 DEVELOPED CONDITIONS BASIN MAP

Bohannan Huston



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SANTOLINA

LEVEL B

NOTES:

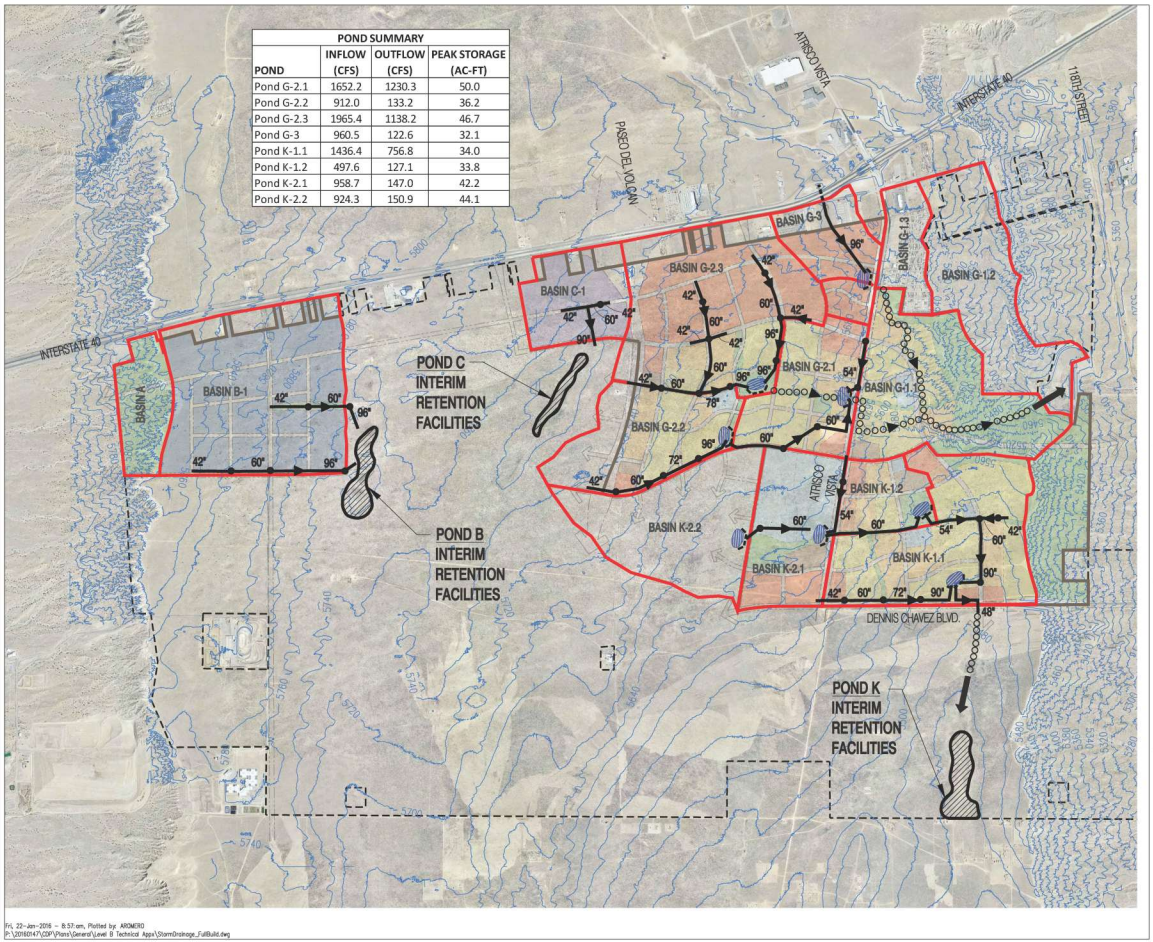
1. WITH DEVELOPMENT OF BASINS B, FLOW ACROSS I-40 FROM OFFSITE BASINS A AND B WILL BE CUT OFF AND RETAINED UPSTREAM OF I-40 (IE, WITHIN THE OFFSITE BASINS RESPECTIVELY).
2. STORMWATER FACILITIES ARE APPROXIMATE AND ILLUSTRATIVE, SUBJECT TO CHANGE.
3. THE DETENTION / RETENTION FACILITIES AND HIGH FLOW CONVEYANCE FACILITIES ARE ILLUSTRATIVE ONLY. FUTURE LEVEL "C" DESIGN REPORTS WILL REFINE THE DRAINAGE CONCEPTS FURTHER.
4. CONVEYANCE FACILITIES (SUCH AS ABOVE GROUND CHANNELS) WILL BE DESIGNED AS ENGINEERED NATURAL ARROYOS WITH MULTI PURPOSE USES, WHERE PRACTICAL.

NORTH 1000 0 2000 4000

2025 DEVELOPED CONDITIONS BASIN MAP

FIGURE 5 –
FULLY DEVELOPED STORM DRAINAGE BACKBONE INFRASTRUCTURE

Bohannan Huston



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SANTOLINA

LEVEL B

LEGEND

- SITE LIMITS
- DEVELOPED BASIN BOUNDARY
- PROPOSED ENGINEERED NATURAL RETENTION FACILITY (ENRF)
- FLOW ARROW
- PROPOSED TRUNK STORM DRAIN
- HIGH FLOW CONVEYANCE FACILITIES (TYP. CHANNELS OR LARGE DIA. STORM DRAIN PIPES)
- DETENTION / RETENTION FACILITIES (PONDS) (SEE NOTE 3)
- EXISTING DRAINAGE FACILITIES
- FULL BUILD LEVEL 'B' BOUNDARY

NOTES:

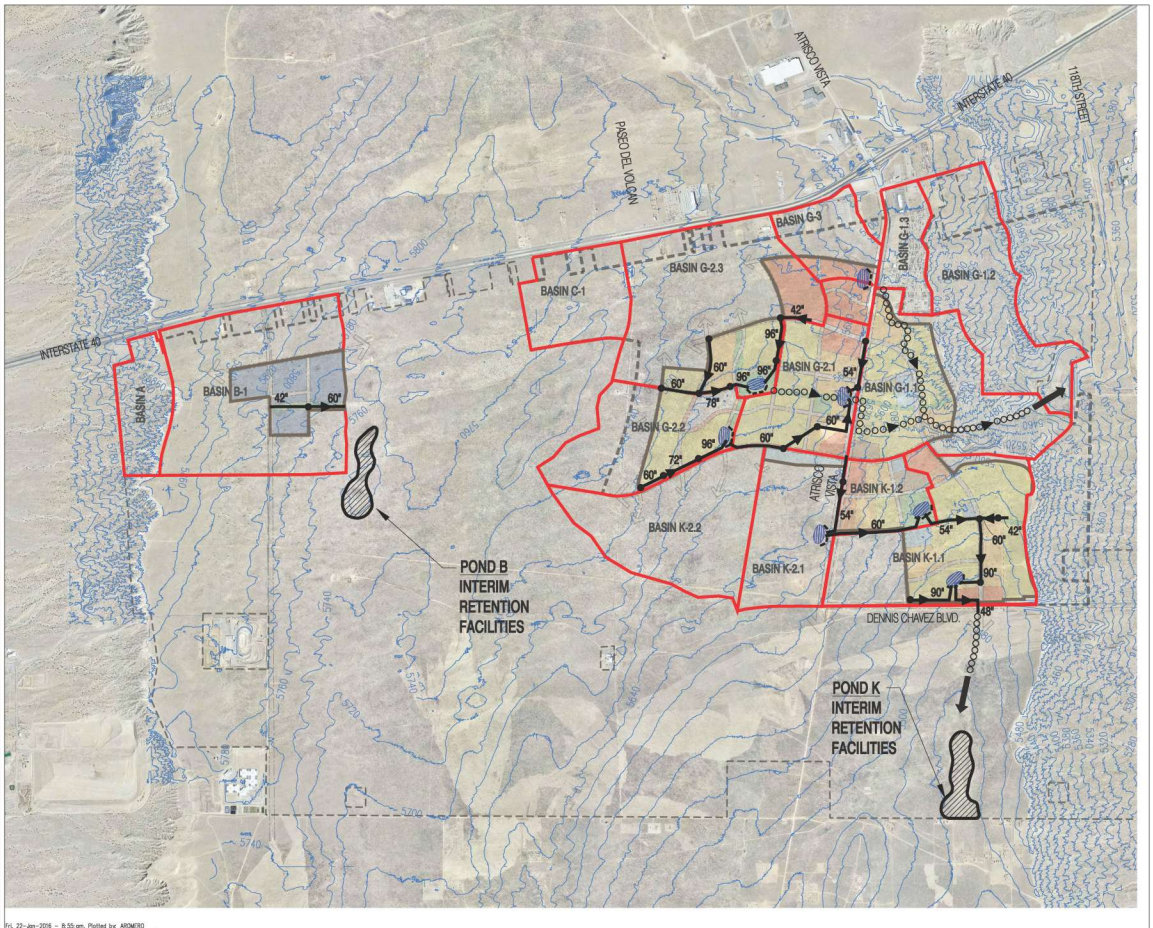
1. WITH DEVELOPMENT OF BASINS B AND C, FLOW ACROSS I40 FROM OFFSITE BASINS A AND B WILL BE CUT OFF AND RETAINED UPSTREAM OF I40 (IE, WITHIN THE OFFSITE BASINS RESPECTIVELY)
2. STORM DRAINAGE FACILITIES ARE APPROXIMATE AND ILLUSTRATIVE, SUBJECT TO CHANGE
3. THE DETENTION / RETENTION FACILITIES AND HIGH FLOW CONVEYANCE FACILITIES ARE ILLUSTRATIVE ONLY. FUTURE LEVEL "C" DESIGN REPORTS WILL REFINE THE DRAINAGE CONCEPTS FURTHER
4. CONVEYANCE FACILITIES (SUCH AS ABOVE GROUND CHANNELS) WILL BE DESIGNED AS ENGINEERED NATURAL ARROYOS WITH MULTI PURPOSE USES, WHERE PRACTICAL.
5. PROPOSED STORM DRAINS SHOWN MAY BE CHANGED TO SURFACE CHANNELS OR OTHER MEANS OF CONVEYANCE BY FUTURE LEVEL 'C' PLANS.

NORTH 750 0 1500 3000

STORM DRAINAGE BACKBONE INFRASTRUCTURE (FULL BUILD 2040)

FIGURE 6 –
2025 STORM DRAINAGE BACKBONE INFRASTRUCTURE

Bohannan Huston



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SANTOLINA

LEVEL B

LEGEND

- SITE LIMITS
- DEVELOPED BASIN BOUNDARY
- PROPOSED ENGINEERED NATURAL RETENTION FACILITY (ENRF)
- FLOW ARROW
- PROPOSED TRUNK STORM DRAIN
- HIGH FLOW CONVEYANCE FACILITIES (TYP. CHANNELS OR LARGE DIA. STORM DRAIN PIPES)
- DETENTION / RETENTION FACILITIES (PONDS) (SEE NOTE 3)
- EXISTING DRAINAGE FACILITIES
- FULL BUILD LEVEL 'B' BOUNDARY

NOTES:

1. WITH DEVELOPMENT OF BASINS B AND C, FLOW ACROSS I40 FROM OFFSITE BASINS A AND B WILL BE CUT OFF AND RETAINED UPSTREAM OF I40 (IE, WITHIN THE OFFSITE BASINS RESPECTIVELY)
2. STORM DRAINAGE FACILITIES ARE APPROXIMATE AND ILLUSTRATIVE, SUBJECT TO CHANGE
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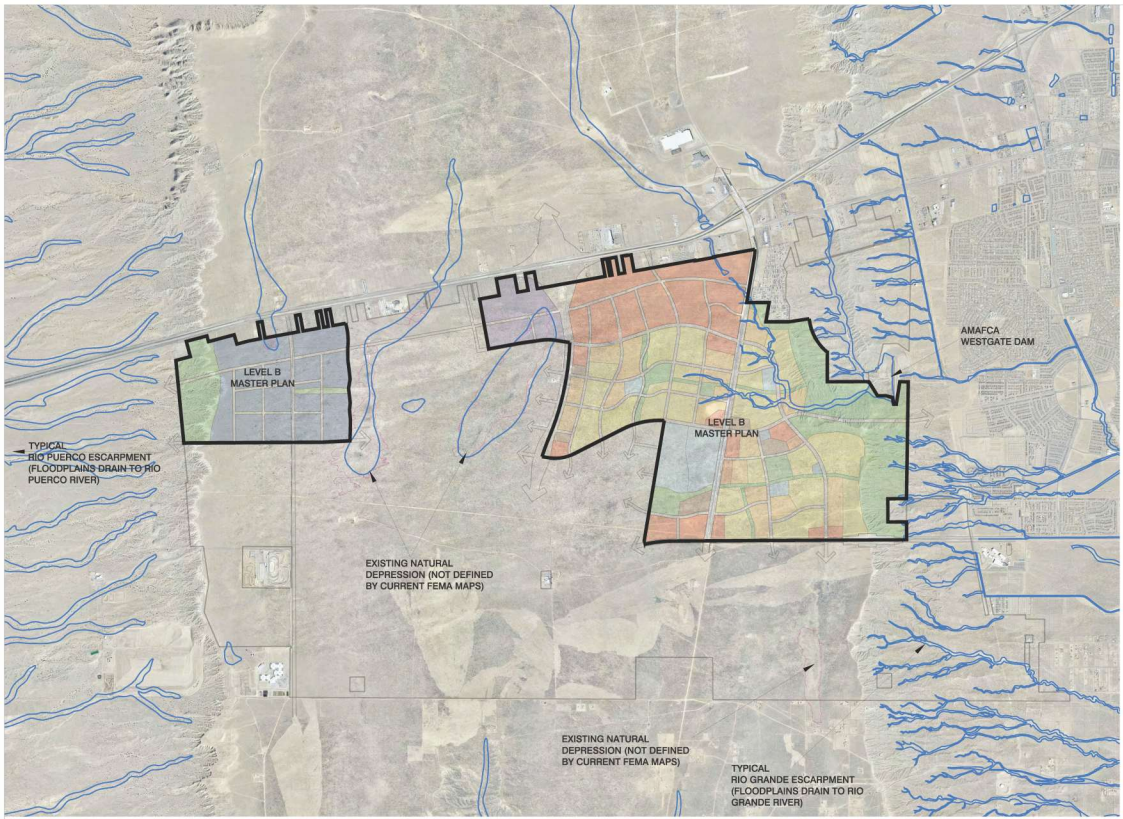
4. CONVEYANCE FACILITIES (SUCH AS ABOVE GROUND CHANNELS) WILL BE DESIGNED AS ENGINEERED NATURAL ARROYOS WITH MULTI PURPOSE USES, WHERE PRACTICAL.
5. PROPOSED STORM DRAINS SHOWN MAY BE CHANGED TO SURFACE CHANNELS OR OTHER MEANS OF CONVEYANCE BY FUTURE LEVEL 'C' PLANS.

NORTH 750 0 1500 3000

STORM DRAINAGE BACKBONE INFRASTRUCTURE (2025)

FIGURE 7 -
FLOODPLAINS

Bohannan Huston



SANTOLINA

LEVEL B

LEGEND

EXISTING FEMA FLOOD PLAINS (TYP)

EXISTING NATURAL DEPRESSION
(DEFINED BY CONTOUR MAPS)

NOTES:

1. 100 - YEAR FLOOD (1% CHANCE OF OCCURRENCE IN ONE YEAR) PLAIN LIMITS ARE SHOWN.

NORTH 1000 0 2000 4000

EXISTING FLOOD PLAINS

Exhibit __

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APPENDICES

APPENDIX A – LAND USE CALCULATIONS BY BASIN

APPENDIX B – HEC-HMS INPUT AND SUMMARY FILES

APPENDIX C – STORMWATER MANAGEMENT MASTER PLAN EXISTING CONDITIONS

APPENDIX A –
LAND USE CALCULATIONS BY BASIN

HYDROLOGIC SOIL GROUP B

EXISTING BASINS PARAMETER

										Time of Concentration			
Basin	Tract	Land Use	DU/Ac	Area (AC)	AREA (SQ MI)	% IMP	AREA D	Pervious CN	COMOSITE PERVIOUS CN	Length	slope (%)	T_c (min)	Lag (min)
A	OS	OPEN SPACE		106.4		0.0%	0	61	39.1				
	OS	OPEN SPACE		59.8		0.0%	0	61	21.9				
				166.2		**0.0%**	0	122	**61.0**	1800	17.4%	4.909565	3
				0.2597	mi^2								
B-1													
		IP1		77.7		0.0%	0	61	6.2				
		IP2		46.5		0.0%	0	61	3.7				
		IP3		34.7		0.0%	0	61	2.8				
		IP4		8.8		0.0%	0	61	0.7				
		IP5		25.0		0.0%	0	61	2.0				
		IP6		40.0		0.0%	0	61	3.2				
		IP7		62.4		0.0%	0	61	5.0				
		IP8		100.5		0.0%	0	61	8.0				
		IP9		33.5		0.0%	0	61	2.7				
		IP10		37.5		0.0%	0	61	3.0				
		IP11		41.0		0.0%	0	61	3.3				
		IP12		40.4		0.0%	0	61	3.2				
		IP13		32.2		0.0%	0	61	2.6				
		IP14		30.9		0.0%	0	61	2.5				
		IP15		59.8		0.0%	0	61	4.8				
		OS		7.3		0.0%	0	61	0.6				
		OS		7.3		0.0%	0	61	0.6				
		REM		78.9		0.0%	0	61	6.3				
				764.4		**0.0%**	0		**61.0**	7000	1.7%	34.2056	21
				1.1944	mi^2								
C-1													
	BP1	BUS PK		36.9		0.0%	0	61	9.1				
	BP2	BUS PK		54.6		0.0%	0	61	13.4				
	BP3	BUS PK		103.3		0.0%	0	61	25.4				
		REM OPEN SPACE		53.2		0.0%	0	61	13.1				
				248.0		**0.0%**	0		**61.0**	4000	1.6%	22.75593	14
				0.3875	mi^2								
G-1.1				575.7									
	M5	MULTI FAM	8	27.3		0.0%	0	61	2.9				
	L1	RES	5	35.5		0.0%	0	61	3.8				
	L11	RES	5	65.4		0.0%	0	61	6.9				

	L2	RES	5	18.2		0.0%	0	61	1.9				
	ES1	SCHOOL		16.1		0.0%	0	61	1.7				
	OS	OPEN SPACE		4.6		0.0%	0	61	0.5				
	L3	RES	5	71.2		0.0%	0	61	7.5				
	H1	HD RES	20	13.4		0.0%	0	61	1.4				
	M6	MULTI FAM	8	28.3		0.0%	0	61	3.0				
	OS	OPEN SPACE		285.6		0.0%	0	61	30.3				
		MAJ ART STREET		10.1		0.0%	0	61	1.1				
				575.7		**0.0%**	**0**		**61.0**	6900	2.9%	27.54135	17
				0.8995	mi^2								
G-1.2				482.6									
	A42	RES	5	148.0		0.0%	0	61	20.3				
	A43	BUS PK		60.6		0.0%	0	61	8.3				
		REM OPEN SPACE		231.3		0.0%	0	61	31.8				
		OFF COMM/INDUS		42.7		90.0%	38.43	73	0.7				
				482.6		**8.0%**	**38.43**		**60.4**	7790	2.8%	30.64944	18
				0.7541	mi^2								
G-1.3		MH		136.0		60.0%	81.6	73	39.3				
		REM UNDEV		46.6		0.0%	0	61	28.1				
				182.6		**44.7%**	81.6		**67.5**				
				0.2853	mi^2								
G-2.1				357.7									
	L9	RES	8	10.6		0.0%	0	61	1.8				
	L10	RES	8	31.5		0.0%	0	61	5.4				
	L4	RES	8	51.2		0.0%	0	61	8.7				
	C1	COMM		23.5		0.0%	0	61	4.0				
	M1	MULTI FAM	8	24.9		0.0%	0	61	4.2				
	OS	OPEN SPACE		4.6		0.0%	0	61	0.8				
	L5	RES	8	20.9		0.0%	0	61	3.6				
	L6	RES	8	14.6		0.0%	0	61	2.5				
	L7	RES	8	39.8		0.0%	0	61	6.8				
	M2	MULTI FAM	8	18.4		0.0%	0	61	3.1				
	P	PARK		12.7		0.0%	0	61	2.2				
	M3	MULTI FAM	8	8.8		0.0%	0	61	1.5				
	M4	MULTI FAM	8	26.8		0.0%	0	61	4.6				
	C2	COMM		12.9		0.0%	0	61	2.2				
	ES	SCHOOL		30.2		0.0%	0	61	5.2				
	POR A14	MIX RES (FUTURE)	5.7	0.0		0.0%	0	61	0.0				
		MAJ ART STREET		15.9		0.0%	0	61	2.7				
		REM OPEN SPACE		10.4		0.0%	0	61	1.8				
				357.7		**0.0%**	0		**61.0**	3438	2.8%	16.32654	10
				0.5589	mi^2								

G-2.2				385.7									
	M16	MULTI FAM	8	20.9		0.0%	0	61	3.3				
	L22	RES	8	30.6		0.0%	0	61	4.8				
	M13	MULTI FAM	8	20.1		0.0%	0	61	3.2				
	ES3	SCHOOL		14.5		0.0%	0	61	2.3				
	M17	MULTI FAM	8	20.7		0.0%	0	61	3.3				
	H4	HD RES	20	8.0		0.0%	0	61	1.3				
	C10	COMM		13.2		0.0%	0	61	2.1				
	L21	RES	8	48.2		0.0%	0	61	7.6				
	L20	RES	8	46.7		0.0%	0	61	7.4				
	OS	OPEN SPACE		8.4		0.0%	0	61	1.3				
	POR A14	MIX RES (FUTURE)	5.7	106.6		0.0%	0	61	16.9				
		MAJ ART STREET		13.3		0.0%	0	61	2.1				
		REM OPEN SPACE		34.5		0.0%	0	61	5.5				
				385.7		**0.0%**	**0**		**61.0**	6400	2.8%	26.34495	16
				0.6027	mi^2								
G-2.3				731.6									
	POR TC3	TOWN CENTER		71.1		0.0%	0	61	6.5				
	POR TC4	TOWN CENTER		16.8		0.0%	0	61	1.5				
	TC5	TOWN CENTER		64.8		0.0%	0	61	5.9				
	TC6	TOWN CENTER		53.9		0.0%	0	61	4.9				
	TC7	TOWN CENTER		56.9		0.0%	0	61	5.2				
	TC8	TOWN CENTER		32.5		0.0%	0	61	3.0				
	TC9	TOWN CENTER		96.6		0.0%	0	61	8.8				
	C11	COMM		14.9		0.0%	0	61	1.4				
	H5	HD RES	20	7.7		0.0%	0	61	0.7				
	M15	MULTI FAM	8	29.0		0.0%	0	61	2.7				
	M14	MULTI FAM	8	41.8		0.0%	0	61	3.8				
	L23	RES	5	23.7		0.0%	0	61	2.2				
	OS	OPEN SPACE		5.9		0.0%	0	61	0.5				
	OS	OPEN SPACE		5.6		0.0%	0	61	0.5				
	L8	RES	8	49.4		0.0%	0	61	4.5				
	P	PARK		27.0		0.0%	0	61	2.5				
	POR A14	MIX RES (FUTURE)	5.7	15.1		0.0%	0	61	1.4				
		MAJ ART STREET		12.8		0.0%	0	61	1.2				
		OFFSITE COMM		71.7		90.0%	64.53	73	0.8				
		REM OPEN SPACE		34.4		0.0%	0	61	3.1				
				731.6		**8.8%**	**64.53**		**61.1**	6345	1.5%	33.27912	20
				1.1431	mi^2								
G-3				**224.6**									
	TC1	TOWN CENTER		46.1		0.0%	0	61	16.5				

	POR TC2	TOWN CENTER		25.7		0.0%	0	61	9.2				
	POR TC3	TOWN CENTER		8.0		0.0%	0	61	2.9				
	POR TC4	TOWN CENTER		84.6		0.0%	0	61	30.3				
		OFF COMM/INDUS		60.2		90.0%	54.18	73	2.6				
				224.6		**24.1%**	**54.18**		**61.4**	3150	1.5%	19.4088	12
				0.3509	mi^2								
K-1.1				596.2									
	C4	COMM		19.4		0.0%	0	61	2.0				
	O1	COMM		8.9		0.0%	0	61	0.9				
	L13	RES	5	33.0		0.0%	0	61	3.4				
	PS	COMM		4.7		0.0%	0	61	0.5				
	L14	RES	5	88.9		0.0%	0	61	9.1				
	OS	OPEN SPACE		5.3		0.0%	0	61	0.5				
	OS	OPEN SPACE		10.8		0.0%	0	61	1.1				
	L18	RES	5	30.6		0.0%	0	61	3.1				
	M12	MULTI FAM	8	17.7		0.0%	0	61	1.8				
	ES2	SCHOOL		12.7		0.0%	0	61	1.3				
	OS	OPEN SPACE		9.0		0.0%	0	61	0.9				
	L15	RES	5	49.1		0.0%	0	61	5.0				
	M10	MULTI FAM	8	39.2		0.0%	0	61	4.0				
	L17	RES	5	48.7		0.0%	0	61	5.0				
	C7	COMM		13.5		0.0%	0	61	1.4				
	L19	RES	5	31.4		0.0%	0	61	3.2				
	OS	OPEN SPACE		4.9		0.0%	0	61	0.5				
	M11	MULTI FAM	8	29.0		0.0%	0	61	3.0				
	L16	RES	5	55.7		0.0%	0	61	5.7				
	C5	COMM		8.4		0.0%	0	61	0.9				
	C6	COMM		9.1		0.0%	0	61	0.9				
	M9	MULTI FAM	8	26.6		0.0%	0	61	2.7				
		MAJ ART STREET		16.6		0.0%	0	61	1.7				
		REM OPEN SPACE		23.0		0.0%	0	61	2.4				
				596.2		**0.0%**	**0**		**61.0**	4700	1.3%	27.90884	17
				0.9316	mi^2								
K-1.2				162.6									
	C3	RES	5	16.6		0.0%	0	61	6.2				
	M7	MULTI FAM	8	24.8		0.0%	0	61	9.3				
	FS	COMM		6.1		0.0%	0	61	2.3				
	H2	HD RES	20	19.3		0.0%	0	61	7.2				
	O2	COMM		11.7		0.0%	0	61	4.4				
	M8	MULTI FAM	8	18.1		0.0%	0	61	6.8				
	L12	RES	5	21.1		0.0%	0	61	7.9				
	P	PARK		28.6		0.0%	0	61	10.7				

		MAJ ART STREET		4.4		0.0%	0	61	1.7				
		REM OPEN SPACE		11.9		0.0%	0	61	4.5				
				162.6		**0.0%**	**0**		61.0	3200	1.9%	17.93659	11
				0.2541	mi^2								
K-2.1				**313.0**									
	APS	SCHOOL		76.2		0.0%	0	61	14.9				
	CNM	SCHOOL		71.5		0.0%	0	61	13.9				
	P	PARK		44.0		0.0%	0	61	8.6				
	H3	HD RES	20	26.3		0.0%	0	61	5.1				
	C9	COMM		35.8		0.0%	0	61	7.0				
	C8	COMM		30.9		0.0%	0	61	6.0				
		MAJ ART STREET		28.3		0.0%	0	61	5.5				
				313.0		**0.0%**	**0**		**61.0**	3300	1.5%	20.11663	12
				0.4891	mi^2								
K-2.2				483.6									
	A28	COMM (FUTURE)		159.0		0.0%	0	61	20.1				
	POR A27	COMM (FUTURE)		124.0		0.0%	0	61	15.6				
	POR A14	MIX RES (FUTURE)	5.7	22.0		0.0%	0	61	2.8				
		MAJ ART STREET		8.2		0.0%	0	61	1.0				
		REM OPEN SPACE		170.4		0.0%	0	61	21.5				
				483.6		**0.0%**	**0**		**61.0**				
				0.7556	mi^2					6800	1.2%	38.2509	23

HYDROLOGIC SOIL GROUP B
FULL BUILDOUT BASIN PARAMETERS

										Time of Concentration					
Basin	Tract	Land Use	DU/Ac	Area (AC)	AREA (SQ MI)	% IMP	AREA D	Pervious CN	COMOSITE PERVIOUS CN	Length	slope (%)	top half Tt	lower half Tt	T_c (min)	Lag (min)
A	OS	OPEN SPACE		106.4		0.0%	0	61	39.1						
	OS	OPEN SPACE		59.8		0.0%	0	61	21.9						
				166.2		**0.0%**	0	122	**61.0**	1800	17.4%			4.909565	4
				0.2597	mi^2										
B-1															
		IP1		77.7		70.0%	54.39	73	5.8						
		IP2		46.5		70.0%	32.55	73	3.5						
		IP3		34.7		70.0%	24.29	73	2.6						
		IP4		8.8		70.0%	6.16	73	0.7						
		IP5		25.0		70.0%	17.5	73	1.9						
		IP6		40.0		70.0%	28	73	3.0						
		IP7		62.4		70.0%	43.68	73	4.6						
		IP8		100.5		70.0%	70.35	73	7.5						
		IP9		33.5		70.0%	23.45	73	2.5						
		IP10		37.5		70.0%	26.25	73	2.8						
		IP11		41.0		70.0%	28.7	73	3.0						
		IP12		40.4		70.0%	28.28	73	3.0						
		IP13		32.2		70.0%	22.54	73	2.4						
		IP14		30.9		70.0%	21.63	73	2.3						
		IP15		59.8		70.0%	41.86	73	4.4						
		OS		7.3		0.0%	0	61	1.5						
		OS		7.3		0.0%	0	61	1.5						
		OS		7.3		0.0%	0	61	1.5						
		REM		78.9		0.0%	0	61	16.3						
				764.4		**61.4%**	469.63		**69.2**	7000	1.7%	20.1	6	25.9	16
				1.1944	mi^2										
C-1															
	BP1	BUS PK		36.9		90.0%	33.21	73	3.7						
	BP2	BUS PK		54.6		90.0%	49.14	73	5.5						
	BP3	BUS PK		103.3		90.0%	92.97	73	10.4						
		REM OPEN SPACE		53.2		0.0%	0	61	44.7						
				248.0		**70.7%**	175.32		**64.2**	4000	1.6%	13.3	3	16.7	10
				0.3875	mi^2										
G-1.1				575.7											
	M5	MULTI FAM	8	27.3		60.0%	16.38	73	1.9						
	L1	RES	5	35.5		49.5%	17.5716	73	3.1						
	L11	RES	5	65.4		49.5%	32.37135	73	5.7						
	L2	RES	5	18.2		49.5%	9.00854	73	1.6						
	ES1	SCHOOL		16.1		50.0%	8.05	73	1.4						
	OS	OPEN SPACE		4.6		0.0%	0	61	0.7						
	L3	RES	5	71.2		49.5%	35.2422	73	6.2						

	H1	HD RES	20	13.4		70.0%	9.38	73	0.7							
	M6	MULTI FAM	8	28.3		60.0%	16.98	73	2.0							
	OS	OPEN SPACE		285.6		0.0%	0	61	41.3							
		MAJ ART STREET		10.1		90.0%	9.09	73	0.2							
				575.7		**26.8%**	**154.0737**		**64.7**	6900	2.9%	16.2	6	21.9	13	
				0.8995	mi^2											
G-1.2				482.6												
	A42	RES	5	148.0		49.5%	73.25626	73	17.2							
	A43	BUS PK		60.6		90.0%	54.54	73	1.4							
		REM OPEN SPACE		231.3		0.0%	0	61	44.6							
		OFF COMM/INDUS		42.7		90.0%	38.43	73	1.0							
				482.6		**34.4%**	**166.2263**		**63.2**	7790	2.8%	18.0	6	24.5	15	
				0.7541	mi^2											
G-1.3		MH		136.0		60.0%	81.6	73	39.3	4350	1.5%	14.6	4	18.2	11	
		REM UNDEV		46.6		0.0%	0	61	28.1							
				182.6		**44.7%**	81.6		**67.5**							
				0.2853	mi^2											
G-2.1				357.7												
	L9	RES	8	10.6		60.0%	6.36	73	2.1							
	L10	RES	8	31.5		60.0%	18.9	73	6.3							
	L4	RES	8	51.2		60.0%	30.72	73	10.2							
	C1	COMM		23.5		90.0%	21.15	73	1.2							
	M1	MULTI FAM	8	24.9		60.0%	14.94	73	5.0							
	OS	OPEN SPACE		4.6		0.0%	0	61	1.9							
	L5	RES	8	20.9		60.0%	12.54	73	4.2							
	L6	RES	8	14.6		60.0%	8.76	73	2.9							
	L7	RES	8	39.8		60.0%	23.88	73	8.0							
	M2	MULTI FAM	8	18.4		60.0%	11.04	73	3.7							
	P	PARK		12.7		7.0%	0.889	69	5.6							
	M3	MULTI FAM	8	8.8		60.0%	5.28	73	1.8							
	M4	MULTI FAM	8	26.8		60.0%	16.08	73	5.4							
	C2	COMM		12.9		90.0%	11.61	73	0.6							
	ES	SCHOOL		30.2		50.0%	15.1	73	7.5							
	POR A14	MIX RES (FUTURE)	5.7	0.0		54.7%	0	73	0.0							
		MAJ ART STREET		15.9		90.0%	14.31	73	0.8							
		REM OPEN SPACE		10.4		0.0%	0	61	4.3							
				357.7		**59.1%**	211.559		**71.4**	3438	2.8%	9.6	3	12.4	7	
				0.5589	mi^2											
G-2.2				385.7												
	M16	MULTI FAM	8	20.9		60.0%	12.54	73	3.4							
	L22	RES	8	30.6		60.0%	18.36	73	5.0							
	M13	MULTI FAM	8	20.1		60.0%	12.06	73	3.3							
	ES3	SCHOOL		14.5		50.0%	7.25	73	3.0							
	M17	MULTI FAM	8	20.7		60.0%	12.42	73	3.4							

	H4	HD RES	20	8.0		70.0%	5.6	73	1.0						
	C10	COMM		13.2		90.0%	11.88	73	0.5						
	L21	RES	8	48.2		60.0%	28.92	73	7.9						
	L20	RES	8	46.7		60.0%	28.02	73	7.6						
	OS	OPEN SPACE		8.4		0.0%	0	61	2.9						
	POR A14	MIX RES (FUTURE)	5.7	106.6		54.7%	58.27531	73	19.8						
		MAJ ART STREET		13.3		90.0%	11.97	73	0.5						
		REM OPEN SPACE		34.5		0.0%	0	61	11.8						
				385.7		**53.7%**	**207.2953**		**70.1**	6400	2.8%	15.4	5	20.8	12
				0.6027	mi^2										
G-2.3				731.6											
	POR TC3	TOWN CENTER		71.1		90.0%	63.99	73	2.7						
	POR TC4	TOWN CENTER		16.8		90.0%	15.12	73	0.6						
	TC5	TOWN CENTER		64.8		90.0%	58.32	73	2.5						
	TC6	TOWN CENTER		53.9		90.0%	48.51	73	2.1						
	TC7	TOWN CENTER		56.9		90.0%	51.21	73	2.2						
	TC8	TOWN CENTER		32.5		90.0%	29.25	73	1.3						
	TC9	TOWN CENTER		96.6		90.0%	86.94	73	3.7						
	C11	COMM		14.9		90.0%	13.41	73	0.6						
	H5	HD RES	20	7.7		70.0%	5.39	73	0.9						
	M15	MULTI FAM	8	29.0		60.0%	17.4	73	4.5						
	M14	MULTI FAM	8	41.8		60.0%	25.08	73	6.4						
	L23	RES	5	23.7		49.5%	11.7309	73	4.6						
	OS	OPEN SPACE		5.9		0.0%	0	61	1.9						
	OS	OPEN SPACE		5.6		0.0%	0	61	1.8						
	L8	RES	8	49.4		60.0%	29.64	73	7.6						
	P	PARK		27.0		7.0%	1.89	69	9.1						
	POR A14	MIX RES (FUTURE)	5.7	15.1		54.7%	8.254757	73	2.6						
		MAJ ART STREET		12.8		90.0%	11.52	73	0.5						
		OFFSITE COMM		71.7		90.0%	64.53	73	2.8						
		REM OPEN SPACE		34.4		0.0%	0	61	11.1						
				731.6		**74.1%**	**542.1857**		**69.6**	6345	1.5%	19.5	5	24.8	15
				1.1431	mi^2										
G-3				**224.6**											
	TC1	TOWN CENTER		46.1		90.0%	41.49	73	15.0						
	POR TC2	TOWN CENTER		25.7		90.0%	23.13	73	8.4						
	POR TC3	TOWN CENTER		8.0		90.0%	7.2	73	2.6						
	POR TC4	TOWN CENTER		84.6		90.0%	76.14	73	27.5						
		OFF COMM/INDUS		60.2		90.0%	54.18	73	19.6						
				224.6		**90.0%**	**202.14**		**73.0**	3150	1.5%	11.4	3	14.0	8
				0.3509	mi^2										
K-1.1				596.2											
	C4	COMM		19.4		90.0%	17.46	73	0.5						
	O1	COMM		8.9		90.0%	8.01	73	0.2						
	L13	RES	5	33.0		49.5%	16.33417	73	4.3						

	PS	COMM		4.7		90.0%	4.23	73	0.1						
	L14	RES	5	88.9		49.5%	44.00325	73	11.6						
	OS	OPEN SPACE		5.3		0.0%	0	61	1.1						
	OS	OPEN SPACE		10.8		0.0%	0	61	2.3						
	L18	RES	5	30.6		49.5%	15.14623	73	4.0						
	M12	MULTI FAM	8	17.7		60.0%	10.62	73	1.8						
	ES2	SCHOOL		12.7		50.0%	6.35	73	1.6						
	OS	OPEN SPACE		9.0		0.0%	0	61	1.9						
	L15	RES	5	49.1		49.5%	24.30326	73	6.4						
	M10	MULTI FAM	8	39.2		60.0%	23.52	73	4.0						
	L17	RES	5	48.7		49.5%	24.10527	73	6.3						
	C7	COMM		13.5		90.0%	12.15	73	0.3						
	L19	RES	5	31.4		49.5%	15.54221	73	4.1						
	OS	OPEN SPACE		4.9		0.0%	0	61	1.1						
	M11	MULTI FAM	8	29.0		60.0%	17.4	73	3.0						
	L16	RES	5	55.7		49.5%	27.57009	73	7.3						
	C5	COMM		8.4		90.0%	7.56	73	0.2						
	C6	COMM		9.1		90.0%	8.19	73	0.2						
	M9	MULTI FAM	8	26.6		60.0%	15.96	73	2.7						
		MAJ ART STREET		16.6		90.0%	14.94	73	0.4						
		REM OPEN SPACE		23.0		0.0%	0	61	5.0						
				596.2		**52.6%**	**313.3945**		**70.8**	4700	1.3%	16.4	4	20.3	12
				0.9316	mi^2										
K-1.2				162.6											
	C3	RES	5	16.6		49.5%	8.216581	73	7.4						
	M7	MULTI FAM	8	24.8		60.0%	14.88	73	8.8						
	FS	COMM		6.1		90.0%	5.49	73	0.5						
	H2	HD RES	20	19.3		70.0%	13.51	73	5.1						
	O2	COMM		11.7		90.0%	10.53	73	1.0						
	M8	MULTI FAM	8	18.1		60.0%	10.86	73	6.4						
	L12	RES	5	21.1		49.5%	10.44397	73	9.4						
	P	PARK		28.6		7.0%	2.002	69	22.2						
		MAJ ART STREET		4.4		90.0%	3.96	73	0.4						
		REM OPEN SPACE		11.9		0.0%	0	61	8.8						
				162.6		**49.1%**	**79.89255**		**70.0**	3200	1.9%	10.5	3	13.2	8
				0.2541	mi^2										
K-2.1				**313.0**											
	APS	SCHOOL		76.2		50.0%	38.1	73	21.0						
	CNM	SCHOOL		71.5		50.0%	35.75	73	19.7						
	P	PARK		44.0		7.0%	3.08	69	21.4						
	H3	HD RES	20	26.3		70.0%	18.41	73	4.4						
	C9	COMM		35.8		90.0%	32.22	73	2.0						
	C8	COMM		30.9		90.0%	27.81	73	1.7						
		MAJ ART STREET		28.3		90.0%	25.47	73	1.6						
				313.0		**57.8%**	**180.84**		**71.8**	3300	1.5%	11.8	3	14.5	9
				0.4891	mi^2										

K-2.2				483.6											
	A28	COMM (FUTURE)		159.0		90.0%	143.1	73	5.5						
	POR A27	COMM (FUTURE)		124.0		90.0%	111.6	73	4.3						
	POR A14	MIX RES (FUTURE)	5.7	22.0		54.7%	12.0268	73	3.5						
		MAJ ART STREET		8.2		90.0%	7.38	73	0.3						
		REM OPEN SPACE		170.4		0.0%	0	61	49.6						
				483.6		**56.7%**	**274.1068**		**63.2**						
				0.7556	mi^2					6800	1.2%	22.4	6	28.1	17

HYDROLOGIC SOIL GROUP B

2025 BUILDOUT BASIN PARAMETERS

										Time of Concentration					
Basin	Tract	Land Use	DU/Ac	Area (AC)	AREA (	% IMP	AREA D	Pervious C	COMOSITE PERVIOUS CN	Length	slope (%)	top half Tt	lower half Tt	T_c (min)	Lag (min)
A	OS	OPEN SPACE		106.4		0.0%	0	61	39.1						
	OS	OPEN SPACE		59.8		0.0%	0	61	21.9						
				166.2		**0.0%**	0	122	**61.0**	1800	17.4%			4.909564512	3
				0.2597	mi^2										
B-1															
		IP1		77.7		0.0%	0	61	6.2						
		IP2		46.5		0.0%	0	61	3.7						
		IP3		34.7		0.0%	0	61	2.8						
		IP4		8.8		0.0%	0	61	0.7						
		IP5		25.0		0.0%	0	61	2.0						
		IP6		40.0		0.0%	0	61	3.2						
		IP7		62.4		0.0%	0	61	5.0						
		IP8		100.5		0.0%	0	61	8.0						
		IP9		33.5		0.0%	0	61	2.7						
		IP10		37.5		0.0%	0	61	3.0						
		IP11		41.0		0.0%	0	61	3.3						
		IP12		40.4		0.0%	0	61	3.2						
		IP13		32.2		0.0%	0	61	2.6						
		IP14		30.9		0.0%	0	61	2.5						
		IP15		59.8		0.0%	0	61	4.8						
		OS		7.3		0.0%	0	61	0.6						
		OS		7.3		0.0%	0	61	0.6						
		REM		78.9		0.0%	0	61	6.3						
				764.4		**0.0%**	0		**61.0**	7000	1.7%	20.1	6	25.9	16
				1.1944	mi^2										
C-1															
	BP1	BUS PK		36.9		0.0%	0	61	9.1						
	BP2	BUS PK		54.6		0.0%	0	61	13.4						
	BP3	BUS PK		103.3		0.0%	0	61	25.4						
		REM OPEN SPACE		53.2		0.0%	0	61	13.1						
				248.0		**0.0%**	0		**61.0**	4000	1.6%	13.3	3	16.7	10
				0.3875	mi^2										
G-1.1				575.7											
	M5	MULTI FAM	8	27.3		60.0%	16.38	73	1.9						
	L1	RES	5	35.5		49.5%	17.5716	73	3.1						

	L11	RES	5	65.4		49.5%	32.37135	73	5.7						
	L2	RES	5	18.2		49.5%	9.00854	73	1.6						
	ES1	SCHOOL		16.1		50.0%	8.05	73	1.4						
	OS	OPEN SPACE		4.6		0.0%	0	61	0.7						
	L3	RES	5	71.2		49.5%	35.2422	73	6.2						
	H1	HD RES	20	13.4		70.0%	9.38	73	0.7						
	M6	MULTI FAM	8	28.3		60.0%	16.98	73	2.0						
	OS	OPEN SPACE		285.6		0.0%	0	61	41.3						
		MAJ ART STREET		10.1		90.0%	9.09	73	0.2						
				575.7		**26.8%**	**154.0737**		**64.7**	6900	2.9%	16.2	6	21.9	13
				0.8995	mi^2										
G-1.2				482.6											
	A42	RES	5	148.0		0.0%	0	61	20.3						
	A43	BUS PK		60.6		0.0%	0	61	8.3						
		REM OPEN SPACE		231.3		0.0%	0	61	31.8						
		OFF COMM/INDUS		42.7		90.0%	38.43	73	0.7						
				482.6		**8.0%**	**38.43**		**60.4**	7790	2.8%	18.0	6	24.5	15
				0.7541	mi^2										
G-1.3		MH		136.0		60.0%	81.6	73	39.3						10
		REM UNDEV		46.6		0.0%	0	61	28.1						
				182.6		**44.7%**	81.6		**67.5**						
				0.2853	mi^2										
G-2.1				357.7											
	L9	RES	8	10.6		60.0%	6.36	73	2.1						
	L10	RES	8	31.5		60.0%	18.9	73	6.3						
	L4	RES	8	51.2		60.0%	30.72	73	10.2						
	C1	COMM		23.5		90.0%	21.15	73	1.2						
	M1	MULTI FAM	8	24.9		60.0%	14.94	73	5.0						
	OS	OPEN SPACE		4.6		0.0%	0	61	1.9						
	L5	RES	8	20.9		60.0%	12.54	73	4.2						
	L6	RES	8	14.6		60.0%	8.76	73	2.9						
	L7	RES	8	39.8		60.0%	23.88	73	8.0						
	M2	MULTI FAM	8	18.4		60.0%	11.04	73	3.7						
	P	PARK		12.7		7.0%	0.889	69	5.6						
	M3	MULTI FAM	8	8.8		60.0%	5.28	73	1.8						
	M4	MULTI FAM	8	26.8		60.0%	16.08	73	5.4						
	C2	COMM		12.9		90.0%	11.61	73	0.6						
	ES	SCHOOL		30.2		50.0%	15.1	73	7.5						
	POR A14	MIX RES (FUTURE)	5.7	0.0		54.7%	0	73	0.0						
		MAJ ART STREET		15.9		90.0%	14.31	73	0.8						
		REM OPEN SPACE		10.4		0.0%	0	61	4.3						
				357.7		**59.1%**	211.559		**71.4**	3438	2.8%	9.6	3	12.4	7

				0.5589	mi^2										
G-2.2				385.7											
	M16	MULTI FAM	8	20.9		0.0%	0	61	4.5						
	L22	RES	8	30.6		60.0%	18.36	73	3.1						
	M13	MULTI FAM	8	20.1		60.0%	12.06	73	2.1						
	ES3	SCHOOL		14.5		50.0%	7.25	73	1.9						
	M17	MULTI FAM	8	20.7		0.0%	0	61	4.4						
	H4	HD RES	20	8.0		0.0%	0	61	1.7						
	C10	COMM		13.2		0.0%	0	61	2.8						
	L21	RES	8	48.2		60.0%	28.92	73	4.9						
	L20	RES	8	46.7		60.0%	28.02	73	4.8						
	OS	OPEN SPACE		8.4		0.0%	0	61	1.8						
	POR A14	MIX RES (FUTURE)	5.7	106.6		0.0%	0	61	22.8						
		MAJ ART STREET		13.3		45.0%	5.985	73	1.9						
		REM OPEN SPACE		34.5		0.0%	0	61	7.4						
				385.7		**26.1%**	**100.595**		**64.1**	6400	2.8%	15.4	5	20.8	12
				0.6027	mi^2										
G-2.3				731.6											
	POR TC3	TOWN CENTER		71.1		0.0%	0	61	7.3						
	POR TC4	TOWN CENTER		16.8		0.0%	0	61	1.7						
	TC5	TOWN CENTER		64.8		0.0%	0	61	6.7						
	TC6	TOWN CENTER		53.9		0.0%	0	61	5.6						
	TC7	TOWN CENTER		56.9		0.0%	0	61	5.9						
	TC8	TOWN CENTER		32.5		0.0%	0	61	3.4						
	TC9	TOWN CENTER		96.6		0.0%	0	61	10.0						
	C11	COMM		14.9		0.0%	0	61	1.5						
	H5	HD RES	20	7.7		0.0%	0	61	0.8						
	M15	MULTI FAM	8	29.0		0.0%	0	61	3.0						
	M14	MULTI FAM	8	41.8		60.0%	25.08	73	2.1						
	L23	RES	5	23.7		49.5%	11.7309	73	1.5						
	OS	OPEN SPACE		5.9		0.0%	0	61	0.6						
	OS	OPEN SPACE		5.6		0.0%	0	61	0.6						
	L8	RES	8	49.4		60.0%	29.64	73	2.4						
	P	PARK		27.0		7.0%	1.89	69	2.9						
	POR A14	MIX RES (FUTURE)	5.7	15.1		54.7%	8.254757	73	0.8						
		MAJ ART STREET		12.8		0.0%	0	61	1.3						
		OFFSITE COMM		71.7		90.0%	64.53	73	0.9						
		REM OPEN SPACE		34.4		0.0%	0	61	3.6						
				731.6		**19.3%**	**141.1257**		**62.6**	6345	1.5%	19.5	5	24.8	15
				1.1431	mi^2										
G-3				**224.6**											

	TC1	TOWN CENTER		46.1		90.0%	41.49	73	3.2					
	POR TC2	TOWN CENTER		25.7		90.0%	23.13	73	1.8					
	POR TC3	TOWN CENTER		8.0		0.0%	0	61	4.6					
	POR TC4	TOWN CENTER		84.6		0.0%	0	61	48.8					
		OFF COMM/INDUS		60.2		90.0%	54.18	73	4.2					
				224.6		**52.9%**	**118.8**		**62.5**	3150	1.5%	11.4	3	14.0	8
				0.3509	mi^2										
K-1.1				596.2											
	C4	COMM		19.4		90.0%	17.46	73	0.4					
	O1	COMM		8.9		90.0%	8.01	73	0.2					
	L13	RES	5	33.0		49.5%	16.33417	73	3.4					
	PS	COMM		4.7		90.0%	4.23	73	0.1					
	L14	RES	5	88.9		49.5%	44.00325	73	9.3					
	OS	OPEN SPACE		5.3		0.0%	0	61	0.9					
	OS	OPEN SPACE		10.8		0.0%	0	61	1.9					
	L18	RES	5	30.6		0.0%	0	61	5.3					
	M12	MULTI FAM	8	17.7		0.0%	0	61	3.1					
	ES2	SCHOOL		12.7		50.0%	6.35	73	1.3					
	OS	OPEN SPACE		9.0		0.0%	0	61	1.6					
	L15	RES	5	49.1		49.5%	24.30326	73	5.1					
	M10	MULTI FAM	8	39.2		60.0%	23.52	73	3.2					
	L17	RES	5	48.7		49.5%	24.10527	73	5.1					
	C7	COMM		13.5		0.0%	0	61	2.3					
	L19	RES	5	31.4		0.0%	0	61	5.4					
	OS	OPEN SPACE		4.9		0.0%	0	61	0.8					
	M11	MULTI FAM	8	29.0		0.0%	0	61	5.0					
	L16	RES	5	55.7		49.5%	27.57009	73	5.8					
	C5	COMM		8.4		90.0%	7.56	73	0.2					
	C6	COMM		9.1		90.0%	8.19	73	0.2					
	M9	MULTI FAM	8	26.6		60.0%	15.96	73	2.2					
		MAJ ART STREET		16.6		90.0%	14.94	73	0.3					
		REM OPEN SPACE		23.0		0.0%	0	61	4.0					
				596.2		**40.7%**	**242.536**		**67.1**	4700	1.3%	16.4	4	20.3	12
				0.9316	mi^2										
K-1.2				162.6											
	C3	RES	5	16.6		49.5%	8.216581	73	7.4					
	M7	MULTI FAM	8	24.8		60.0%	14.88	73	8.8					
	FS	COMM		6.1		90.0%	5.49	73	0.5					
	H2	HD RES	20	19.3		70.0%	13.51	73	5.1					
	O2	COMM		11.7		90.0%	10.53	73	1.0					
	M8	MULTI FAM	8	18.1		60.0%	10.86	73	6.4					
	L12	RES	5	21.1		49.5%	10.44397	73	9.4					

	P	PARK		28.6		7.0%	2.002	69	22.2						
		MAJ ART STREET		4.4		90.0%	3.96	73	0.4						
		REM OPEN SPACE		11.9		0.0%	0	61	8.8						
				162.6		**49.1%**	**79.89255**		70.0	3200	1.9%	10.5	3	13.2	8
				0.2541	mi^2										
K-2.1				**313.0**											
	APS	SCHOOL		76.2		0.0%	0	61	14.9						
	CNM	SCHOOL		71.5		0.0%	0	61	13.9						
	P	PARK		44.0		0.0%	0	61	8.6						
	H3	HD RES	20	26.3		0.0%	0	61	5.1						
	C9	COMM		35.8		0.0%	0	61	7.0						
	C8	COMM		30.9		0.0%	0	61	6.0						
		MAJ ART STREET		28.3		0.0%	0	61	5.5						
				313.0		**0.0%**	**0**		**61.0**	3300	1.5%	11.8	3	14.5	9
				0.4891	mi^2										
K-2.2				483.6											
	A28	COMM (FUTURE)		159.0		0.0%	0	61	20.1						
	POR A27	COMM (FUTURE)		124.0		0.0%	0	61	15.6						
	POR A14	MIX RES (FUTURE)	5.7	22.0		0.0%	0	61	2.8						
		MAJ ART STREET		8.2		0.0%	0	61	1.0						
		REM OPEN SPACE		170.4		0.0%	0	61	21.5						
				483.6		**0.0%**	**0**		**61.0**						
				0.7556	mi^2					6800	1.2%	22.4	6	28.1	17

APPENDIX B –

HEC HMS INPUT AND SUMMARY OUTPUT FILES

HEC-HMS SUMMARY OUTPUT

Project: Santolina Level B Simulation Run: 24 hr Full Build

Start of Run: 01Jan2015, 00:00
End of Run: 02Jan2015, 00:00
Compute Time: 21Jan2016, 08:59:00

Basin Model: Proposed Full Build
Meteorologic Model: 24hr
Control Specifications: 24 hr 2min

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
Subbasin-G-2.3	1.1431	1965.4	01Jan2015, 06:16	138.3
Pond G-2.3	1.1431	1138.2	01Jan2015, 06:30	135.1
Subbasin-G-2.2	0.6027	912.0	01Jan2015, 06:14	58.5
Pond G-2.2	0.6027	133.2	01Jan2015, 06:50	53.4
Subbasin-G-2.1	0.5589	1165.1	01Jan2015, 06:08	58.6
Pond G-2.1	2.3047	1230.3	01Jan2015, 06:44	242.4
Subbasin-G-1.1	0.8995	699.6	01Jan2015, 06:16	51.1
Subbasin-G-1.2	0.7541	641.2	01Jan2015, 06:18	49.0
Subbasin-G-3	0.3509	960.5	01Jan2015, 06:10	49.5
Pond G-3	0.3509	122.6	01Jan2015, 06:40	45.1
G-1.1 Outfall	4.5945	2460.7	01Jan2015, 06:20	410.8
Subbasin-K-2.2	0.7556	924.3	01Jan2015, 06:18	71.5
Pond K-2.2	0.7556	150.9	01Jan2015, 07:02	66.0
Subbasin-K-2.1	0.4891	908.3	01Jan2015, 06:10	50.7
Pond K-2.1	1.2447	147.0	01Jan2015, 08:12	108.6
Subbasin-K-1.2	0.2541	433.1	01Jan2015, 06:10	23.2
Pond K-1.2	1.4988	127.1	01Jan2015, 11:10	121.3
Subbasin-K-1.1	0.9316	1402.6	01Jan2015, 06:14	89.9
Pond K-1.1	2.4304	756.8	01Jan2015, 06:28	205.4
Subbasin-B-1	1.1944	1706.0	01Jan2015, 06:18	125.9
Subbasin-C-1	0.3875	760.4	01Jan2015, 06:12	44.1
Subbasin-A	0.2597	54.4	01Jan2015, 06:10	4.1
Subbasin-G-1.3	0.2853	374.8	01Jan2015, 06:14	23.7
Pond G-1.3	0.2853	181.6	01Jan2015, 06:28	23.2

Project: Santolina Level B Simulation Run: 24 hr Exist

Start of Run: 01Jan2015, 00:00
End of Run: 02Jan2015, 00:00
Compute Time: 21Jan2016, 16:33:05

Basin Model: Existing Condition
Meteorologic Model: 24hr
Control Specifications: 24 hr 2min

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Subbasin-G-3	0.3509	237.4	01Jan2015, 06:14	0.92
Subbasin-A	0.2597	54.4	01Jan2015, 06:10	0.30
Subbasin-B-1	1.1944	142.2	01Jan2015, 06:36	0.29
Subbasin-C-1	0.3875	54.5	01Jan2015, 06:26	0.29
Subbasin-G-1.1	0.8995	117.3	01Jan2015, 06:30	0.29
Subbasin-G-1.2	0.7541	182.4	01Jan2015, 06:24	0.48
Subbasin-G-1.3	0.2853	652.3	01Jan2015, 06:08	2.01
Subbasin-G-2.1	0.5589	88.6	01Jan2015, 06:20	0.29
Subbasin-G-2.2	0.6027	80.5	01Jan2015, 06:28	0.29
Subbasin-G-2.3	1.1431	291.5	01Jan2015, 06:26	0.52
Subbasin-K-1.1	0.9316	121.5	01Jan2015, 06:30	0.29
Subbasin-K-1.2	0.2541	38.9	01Jan2015, 06:22	0.29
Subbasin-K-2.1	0.4891	72.8	01Jan2015, 06:22	0.29
Subbasin-K-2.2	0.7556	86.3	01Jan2015, 06:38	0.29
Subbasin-K-3	2.2800	271.5	01Jan2015, 06:36	0.29

Project: Santolina Level B Simulation Run: 10-day Exist

Start of Run: 01Jan2015, 00:00
End of Run: 11Jan2015, 00:00
Compute Time: 21Jan2016, 16:33:12

Basin Model: Existing Condition
Meteorologic Model: 10 day
Control Specifications: 10 day

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
Subbasin-A	0.2597	157.4	03Jan2015, 12:06	14.5
Subbasin-B-1	1.1944	336.2	03Jan2015, 12:30	66.4
Subbasin-C-1	0.3875	136.6	03Jan2015, 12:20	21.6
Subbasin-G-1.1	0.8995	285.7	03Jan2015, 12:24	50.0
Subbasin-G-1.2	0.7541	312.9	03Jan2015, 12:24	51.7
Subbasin-G-1.3	0.2853	715.6	03Jan2015, 12:08	52.4
Subbasin-G-2.1	0.5589	232.1	03Jan2015, 12:14	31.1
Subbasin-G-2.2	0.6027	197.6	03Jan2015, 12:22	33.5
Subbasin-G-2.3	1.1431	483.2	03Jan2015, 12:26	82.4
Subbasin-G-3	0.3509	308.1	03Jan2015, 12:14	35.4
Subbasin-K-1.1	0.9316	295.9	03Jan2015, 12:24	51.8
Subbasin-K-1.2	0.2541	101.2	03Jan2015, 12:16	14.1
Subbasin-K-2.1	0.4891	186.2	03Jan2015, 12:18	27.2
Subbasin-K-2.2	0.7556	201.9	03Jan2015, 12:32	42.0
Subbasin-K-3	2.2800	641.7	03Jan2015, 12:30	126.7

Project: Santolina Level B Simulation Run: 24 hr 2025 Build

Start of Run: 01Jan2015, 00:00
End of Run: 02Jan2015, 00:00
Compute Time: 21Jan2016, 14:04:07

Basin Model: 2025 Proposed Buil
Meteorologic Model: 24hr
Control Specifications: 24 hr 2min

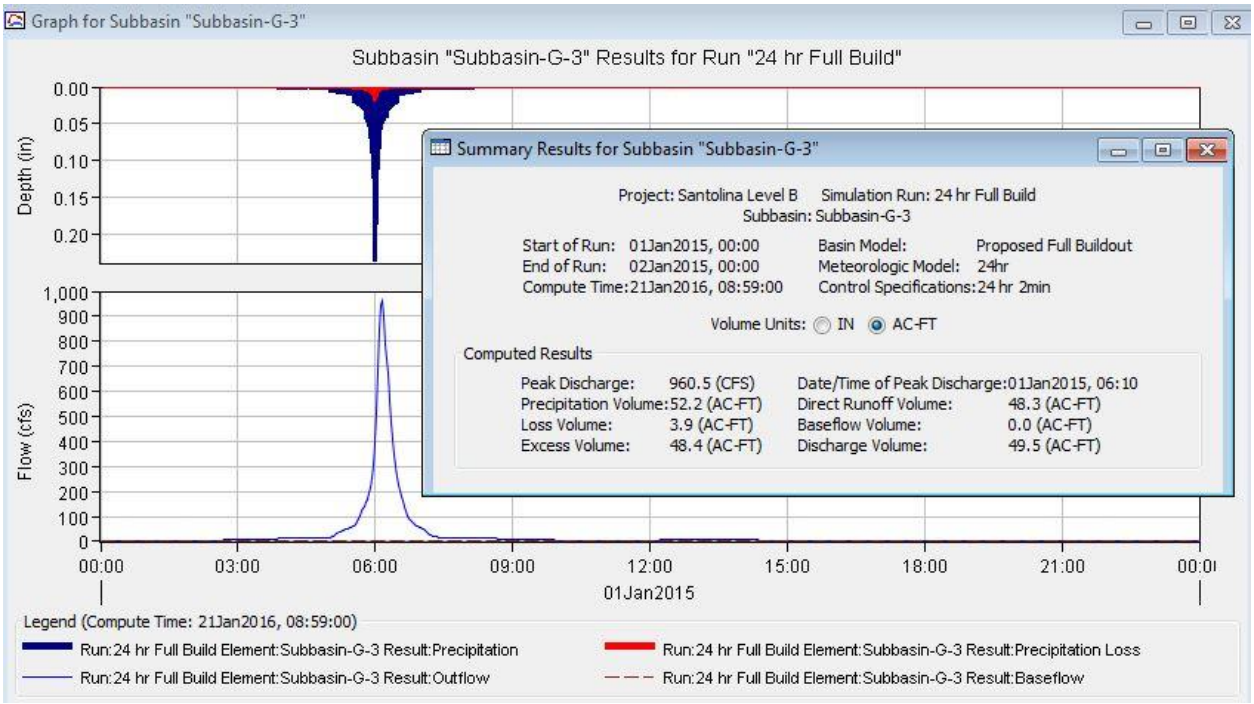
Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Subbasin-G-2.3	1.1431	607.1	01Jan2015, 06:18	0.83
Pond G-2.3	1.1431	305.3	01Jan2015, 06:38	0.79
Subbasin-G-2.2	0.6027	468.0	01Jan2015, 06:14	1.03
Pond G-2.2	0.6027	72.1	01Jan2015, 06:54	0.90
Subbasin-G-2.1	0.5589	1165.1	01Jan2015, 06:08	1.96
Pond G-2.1	2.3047	589.1	01Jan2015, 06:32	1.07
Subbasin-G-1.1	0.8995	699.6	01Jan2015, 06:16	1.07
Subbasin-G-1.2	0.7541	197.6	01Jan2015, 06:20	0.48
Subbasin-G-3	0.3509	575.8	01Jan2015, 06:10	1.67
Pond G-3	0.3509	73.4	01Jan2015, 06:42	1.47
G-1.1 Outfall	4.5945	1631.7	01Jan2015, 06:18	1.03
Subbasin-K-2.2	0.7556	98.5	01Jan2015, 06:30	0.29
Pond K-2.2	0.7556	9.0	01Jan2015, 08:20	0.20
Subbasin-K-2.1	0.4891	80.1	01Jan2015, 06:18	0.29
Pond K-2.1	1.2447	8.8	01Jan2015, 11:24	0.17
Subbasin-K-1.2	0.2541	433.1	01Jan2015, 06:10	1.72
Pond K-1.2	1.4988	48.3	01Jan2015, 06:46	0.35
Subbasin-K-1.1	0.9316	1090.8	01Jan2015, 06:14	1.46
Pond K-1.1	2.4304	572.5	01Jan2015, 06:30	0.75
Subbasin-B-1	1.1944	159.5	01Jan2015, 06:28	0.29
Subbasin-C-1	0.3875	61.4	01Jan2015, 06:20	0.29
Subbasin-A	0.2597	54.4	01Jan2015, 06:10	0.30
Subbasin-G-1.3	0.2853	374.8	01Jan2015, 06:14	1.56
Pond G-1.3	0.2853	181.6	01Jan2015, 06:28	1.52

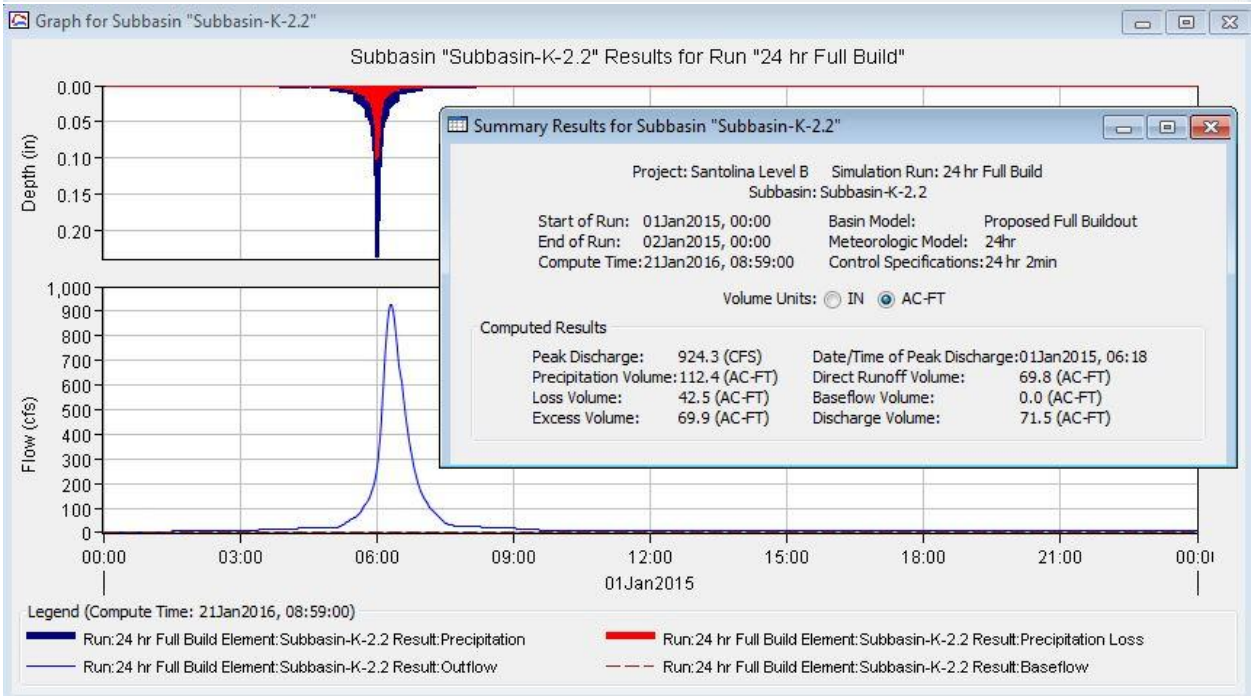
Project: Santolina Level B Simulation Run: 10-day Full Build

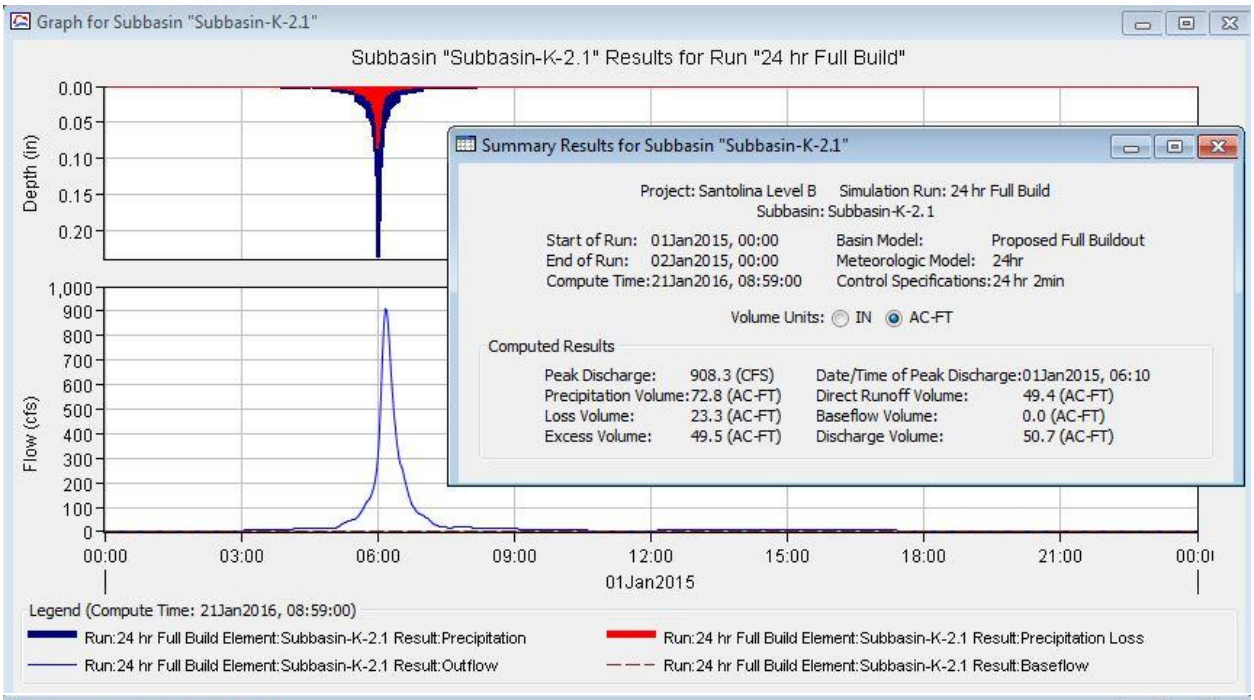
Start of Run: 01Jan2015, 00:00
End of Run: 11Jan2015, 00:00
Compute Time: 21Jan2016, 14:13:22

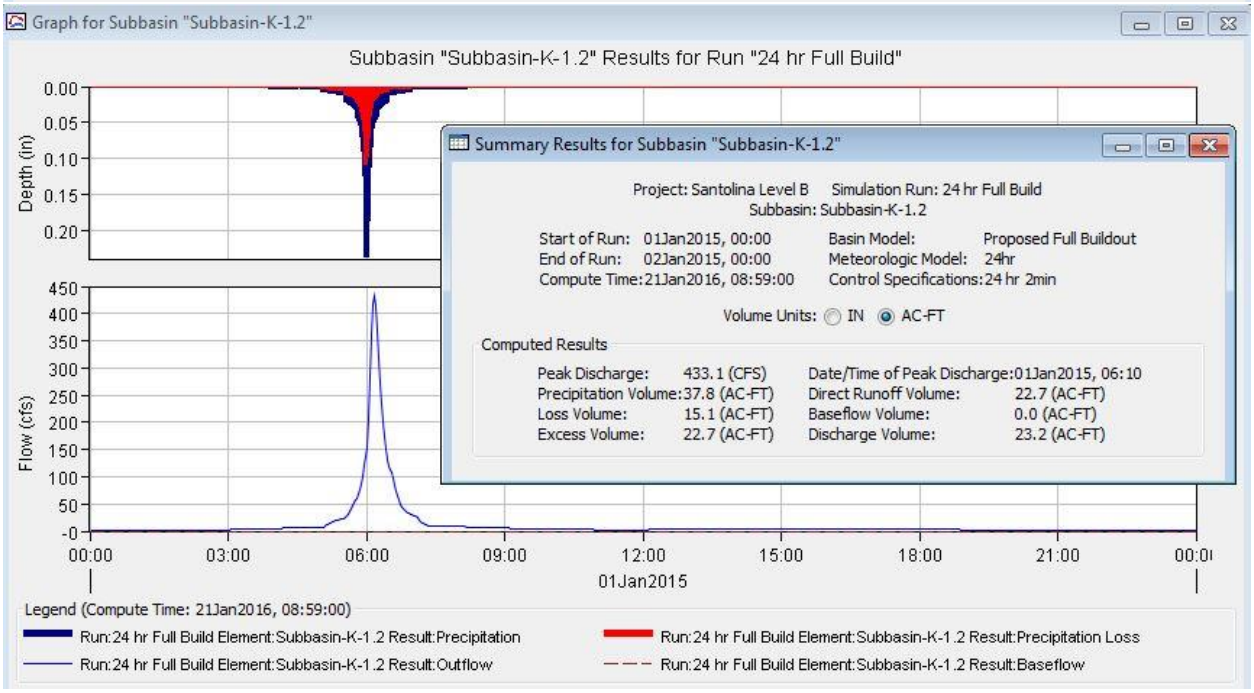
Basin Model: Proposed Full Build
Meteorologic Model: 10 day
Control Specifications: 10 day

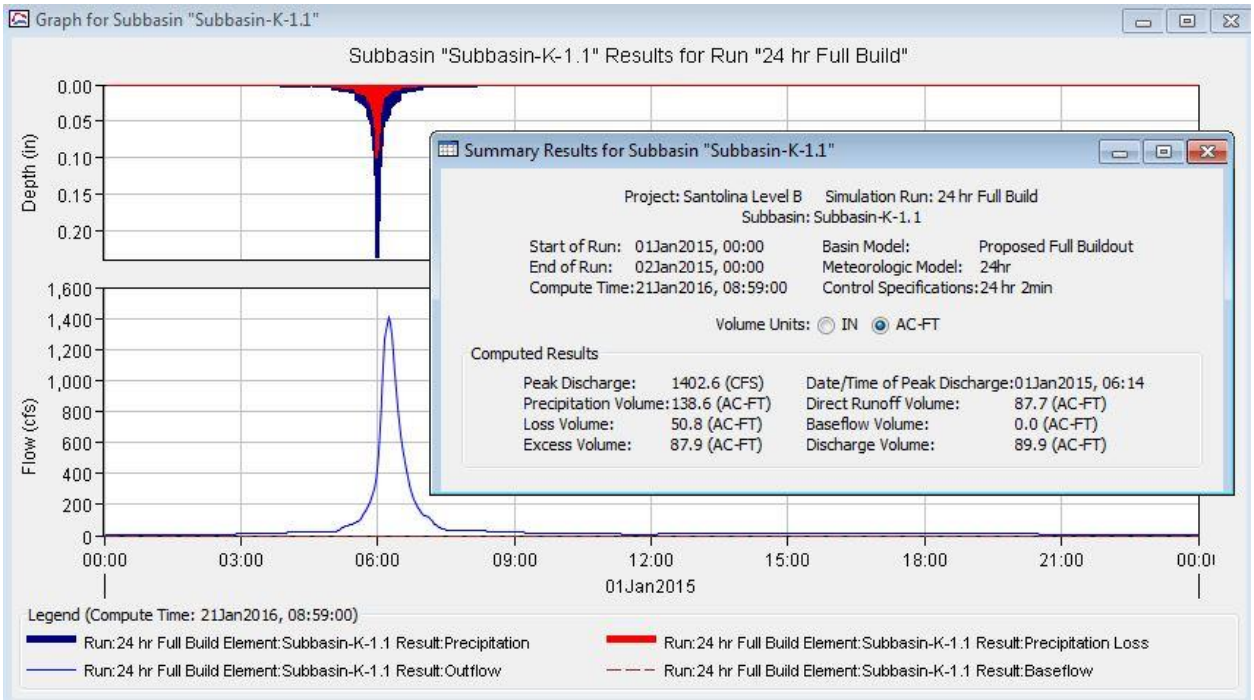
Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Subbasin-G-2.3	1.1431	2068.4	03Jan2015, 12:16	3.75
Pond G-2.3	1.1431	1192.1	03Jan2015, 12:30	3.72
Subbasin-G-2.2	0.6027	1023.0	03Jan2015, 12:14	3.18
Pond G-2.2	0.6027	144.3	03Jan2015, 12:50	3.09
Subbasin-G-2.1	0.5589	1287.8	03Jan2015, 12:08	3.37
Pond G-2.1	2.3047	1300.6	03Jan2015, 12:44	3.45
Subbasin-G-1.1	0.8995	903.0	03Jan2015, 12:16	2.14
Subbasin-G-1.2	0.7541	769.7	03Jan2015, 12:18	2.32
Subbasin-G-3	0.3509	978.0	03Jan2015, 12:10	4.23
Pond G-3	0.3509	127.3	03Jan2015, 12:40	4.12
G-1.1 Outfall	4.5945	2871.5	03Jan2015, 12:20	3.02
Subbasin-K-2.2	0.7556	1001.2	03Jan2015, 12:20	3.06
Pond K-2.2	0.7556	159.3	03Jan2015, 13:02	2.99
Subbasin-K-2.1	0.4891	1008.1	03Jan2015, 12:10	3.35
Pond K-2.1	1.2447	158.8	03Jan2015, 14:08	3.07
Subbasin-K-1.2	0.2541	495.7	03Jan2015, 12:10	3.04
Pond K-1.2	1.4988	139.7	03Jan2015, 17:14	3.01
Subbasin-K-1.1	0.9316	1580.8	03Jan2015, 12:14	3.17
Pond K-1.1	2.4304	881.6	03Jan2015, 12:28	3.05
Subbasin-B-1	1.1944	1857.1	03Jan2015, 12:18	3.37
Subbasin-C-1	0.3875	800.8	03Jan2015, 12:12	3.54
Subbasin-A	0.2597	157.4	03Jan2015, 12:06	1.04
Subbasin-G-1.3	0.2853	435.5	03Jan2015, 12:12	2.82
Pond G-1.3	0.2853	198.4	03Jan2015, 12:28	2.79

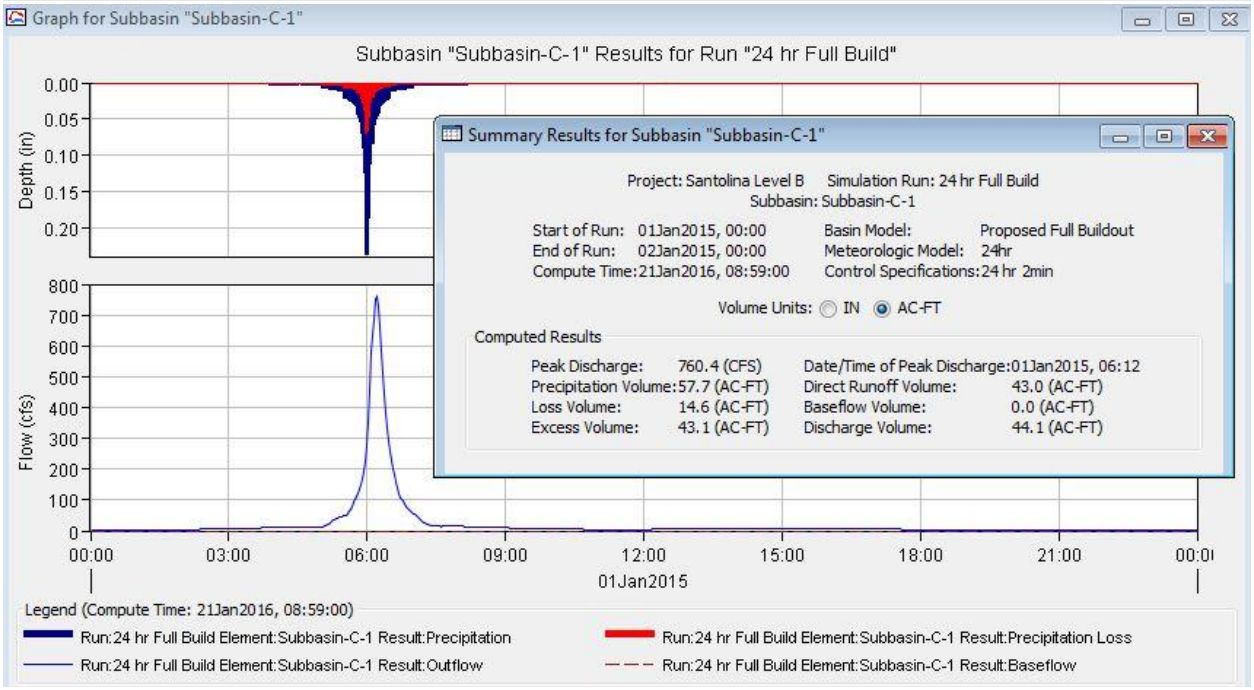

Graph for Subbasin "Subbasin-G-3"
Subbasin "Subbasin-G-3" Results for Run "24 hr Full Build"
Depth (in)
Flow (cfs)
01Jan2015
Summary Results for Subbasin "Subbasin-G-3"
Project: Santolina Level B Simulation Run: 24 hr Full Build
Subbasin: Subbasin-G-3
Start of Run: 01Jan2015, 00:00
End of Run: 02Jan2015, 00:00
Compute Time: 21Jan2016, 08:59:00
Basin Model: Proposed Full Buildout
Meteorologic Model: 24hr
Control Specifications: 24 hr 2min
Volume Units: IN AC-FT
Computed Results
Peak Discharge: 960.5 (CFS)
Precipitation Volume: 52.2 (AC-FT)
Loss Volume: 3.9 (AC-FT)
Excess Volume: 48.4 (AC-FT)
Date/Time of Peak Discharge: 01Jan2015, 06:10
Direct Runoff Volume: 48.3 (AC-FT)
Baseflow Volume: 0.0 (AC-FT)
Discharge Volume: 49.5 (AC-FT)
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Subbasin-G-3 Result:Precipitation
Run:24 hr Full Build Element:Subbasin-G-3 Result:Precipitation Loss
Run:24 hr Full Build Element:Subbasin-G-3 Result:Outflow
Run:24 hr Full Build Element:Subbasin-G-3 Result:Baseflow

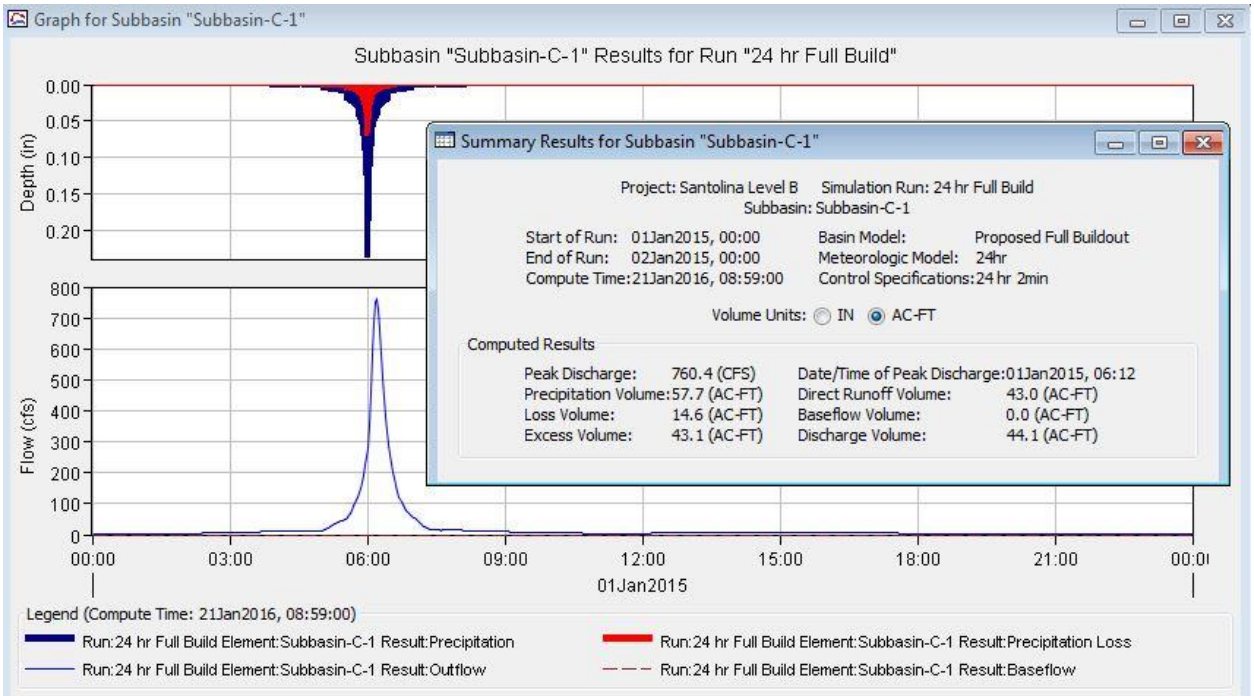

Graph for Subbasin "Subbasin-K-2.2"
Subbasin "Subbasin-K-2.2" Results for Run "24 hr Full Build"
Depth (in)
Flow (cfs)
01Jan2015
Summary Results for Subbasin "Subbasin-K-2.2"
Project: Santolina Level B Simulation Run: 24 hr Full Build
Subbasin: Subbasin-K-2.2
Start of Run: 01Jan2015, 00:00
End of Run: 02Jan2015, 00:00
Compute Time: 21Jan2016, 08:59:00
Basin Model: Proposed Full Buildout
Meteorologic Model: 24hr
Control Specifications: 24 hr 2min
Volume Units: IN AC-FT
Computed Results
Peak Discharge: 924.3 (CFS)
Precipitation Volume: 112.4 (AC-FT)
Loss Volume: 42.5 (AC-FT)
Excess Volume: 69.9 (AC-FT)
Date/Time of Peak Discharge: 01Jan2015, 06:18
Direct Runoff Volume: 69.8 (AC-FT)
Baseflow Volume: 0.0 (AC-FT)
Discharge Volume: 71.5 (AC-FT)
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Subbasin-K-2.2 Result:Precipitation
Run:24 hr Full Build Element:Subbasin-K-2.2 Result:Precipitation Loss
Run:24 hr Full Build Element:Subbasin-K-2.2 Result:Outflow
Run:24 hr Full Build Element:Subbasin-K-2.2 Result:Baseflow

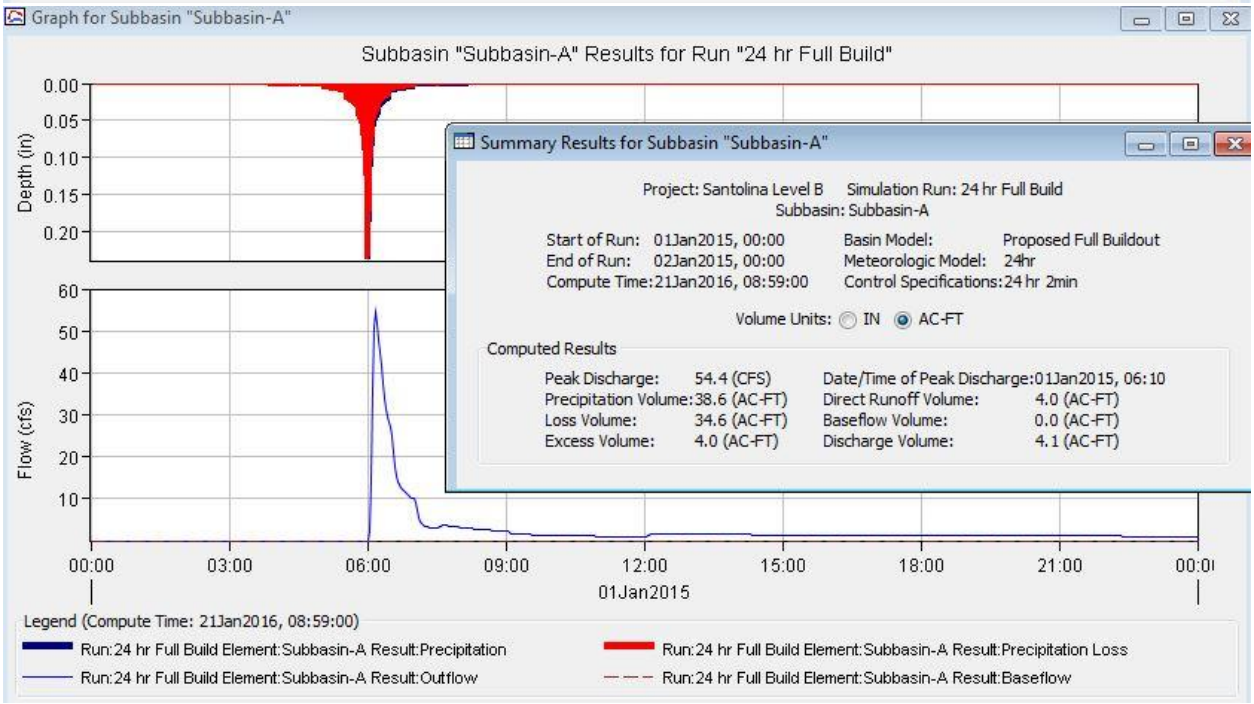

Graph for Subbasin "Subbasin-K-2.1"
Subbasin "Subbasin-K-2.1" Results for Run "24 hr Full Build"
Depth (in)
Flow (cfs)
01Jan2015
Summary Results for Subbasin "Subbasin-K-2.1"
Project: Santolina Level B Simulation Run: 24 hr Full Build
Subbasin: Subbasin-K-2.1
Start of Run: 01Jan2015, 00:00
End of Run: 02Jan2015, 00:00
Compute Time: 21Jan2016, 08:59:00
Basin Model: Proposed Full Buildout
Meteorologic Model: 24hr
Control Specifications: 24 hr 2min
Volume Units: IN AC-FT
Computed Results
Peak Discharge: 908.3 (CFS)
Precipitation Volume: 72.8 (AC-FT)
Loss Volume: 23.3 (AC-FT)
Excess Volume: 49.5 (AC-FT)
Date/Time of Peak Discharge: 01Jan2015, 06:10
Direct Runoff Volume: 49.4 (AC-FT)
Baseflow Volume: 0.0 (AC-FT)
Discharge Volume: 50.7 (AC-FT)
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Subbasin-K-2.1 Result:Precipitation
Run:24 hr Full Build Element:Subbasin-K-2.1 Result:Precipitation Loss
Run:24 hr Full Build Element:Subbasin-K-2.1 Result:Outflow
Run:24 hr Full Build Element:Subbasin-K-2.1 Result:Baseflow

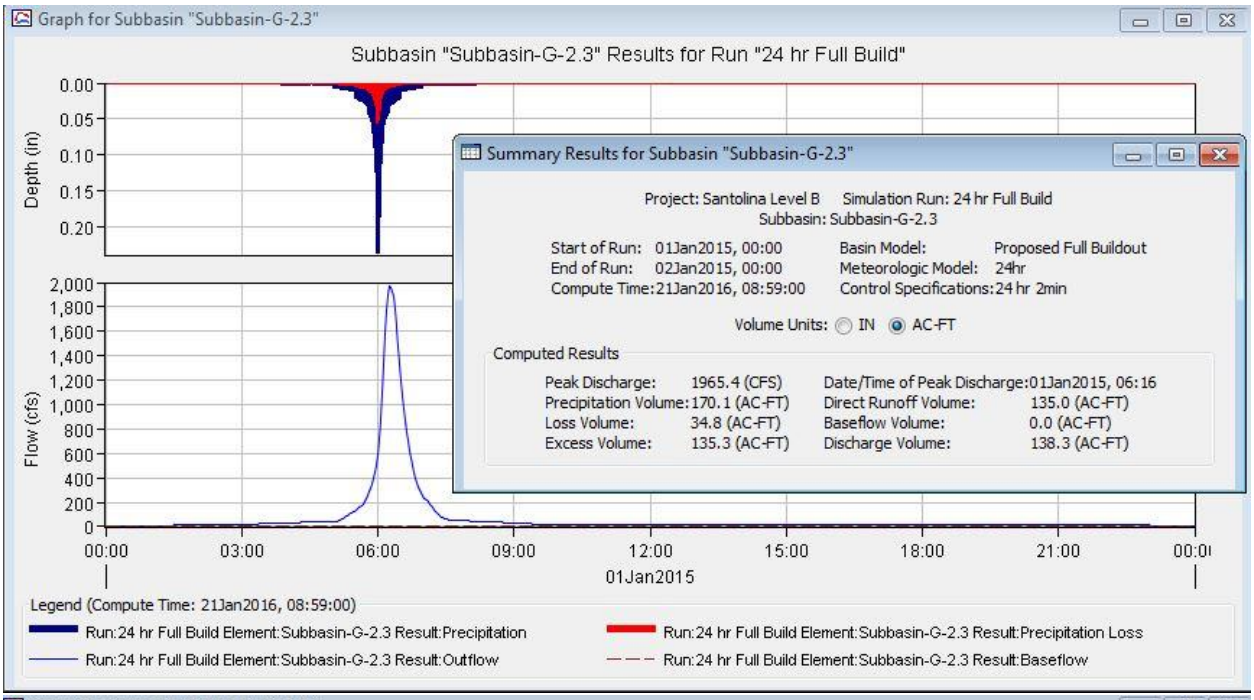

Graph for Subbasin "Subbasin-K-1.2"
Subbasin "Subbasin-K-1.2" Results for Run "24 hr Full Build"
Depth (in)
Flow (cfs)
01Jan2015
Summary Results for Subbasin "Subbasin-K-1.2"
Project: Santolina Level B Simulation Run: 24 hr Full Build
Subbasin: Subbasin-K-1.2
Start of Run: 01Jan2015, 00:00
End of Run: 02Jan2015, 00:00
Compute Time: 21Jan2016, 08:59:00
Basin Model: Proposed Full Buildout
Meteorologic Model: 24hr
Control Specifications: 24 hr 2min
Volume Units: IN AC-FT
Computed Results
Peak Discharge: 433.1 (CFS)
Precipitation Volume: 37.8 (AC-FT)
Loss Volume: 15.1 (AC-FT)
Excess Volume: 22.7 (AC-FT)
Date/Time of Peak Discharge: 01Jan2015, 06:10
Direct Runoff Volume: 22.7 (AC-FT)
Baseflow Volume: 0.0 (AC-FT)
Discharge Volume: 23.2 (AC-FT)
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Subbasin-K-1.2 Result:Precipitation
Run:24 hr Full Build Element:Subbasin-K-1.2 Result:Precipitation Loss
Run:24 hr Full Build Element:Subbasin-K-1.2 Result:Outflow
Run:24 hr Full Build Element:Subbasin-K-1.2 Result:Baseflow

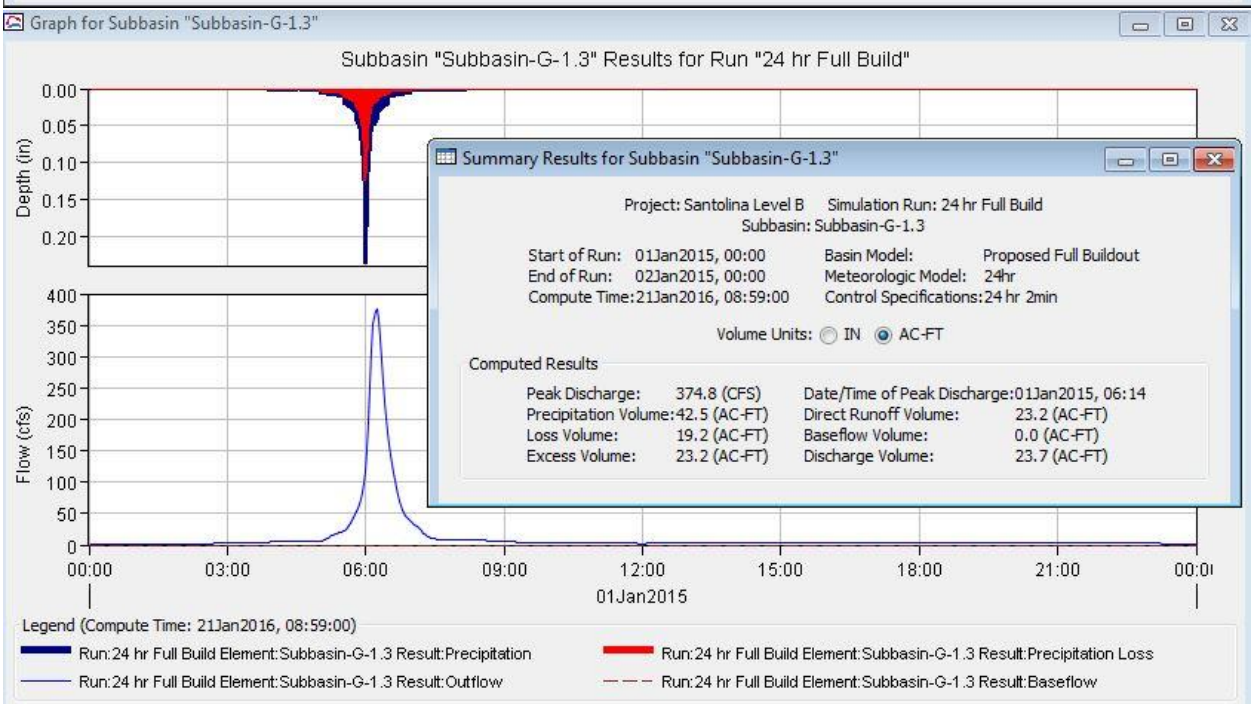

Graph for Subbasin "Subbasin-K-1.1"
Subbasin "Subbasin-K-1.1" Results for Run "24 hr Full Build"
Depth (in)
Flow (cfs)
01Jan2015
Summary Results for Subbasin "Subbasin-K-1.1"
Project: Santolina Level B Simulation Run: 24 hr Full Build
Subbasin: Subbasin-K-1.1
Start of Run: 01Jan2015, 00:00
End of Run: 02Jan2015, 00:00
Compute Time: 21Jan2016, 08:59:00
Basin Model: Proposed Full Buildout
Meteorologic Model: 24hr
Control Specifications: 24 hr 2min
Volume Units: IN AC-FT
Computed Results
Peak Discharge: 1402.6 (CFS)
Precipitation Volume: 138.6 (AC-FT)
Loss Volume: 50.8 (AC-FT)
Excess Volume: 87.9 (AC-FT)
Date/Time of Peak Discharge: 01Jan2015, 06:14
Direct Runoff Volume: 87.7 (AC-FT)
Baseflow Volume: 0.0 (AC-FT)
Discharge Volume: 89.9 (AC-FT)
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Subbasin-K-1.1 Result:Precipitation
Run:24 hr Full Build Element:Subbasin-K-1.1 Result:Precipitation Loss
Run:24 hr Full Build Element:Subbasin-K-1.1 Result:Outflow
Run:24 hr Full Build Element:Subbasin-K-1.1 Result:Baseflow

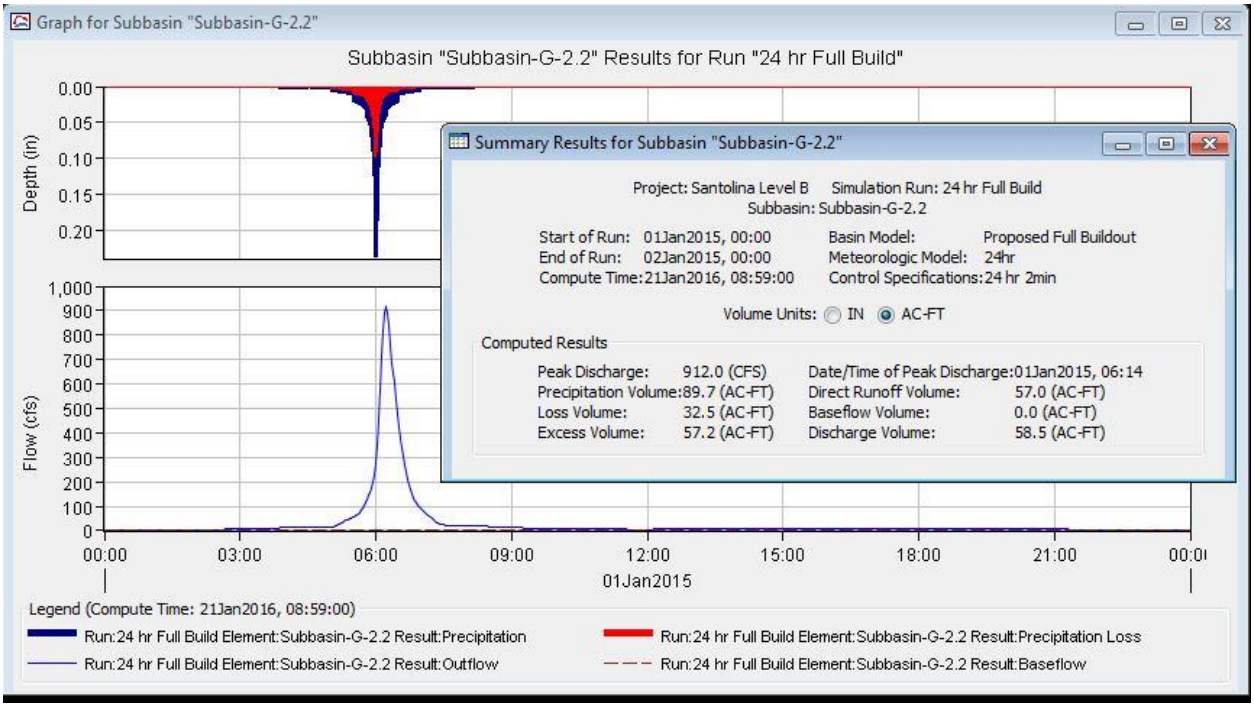

Graph for Subbasin "Subbasin-C-1"
Subbasin "Subbasin-C-1" Results for Run "24 hr Full Build"
Depth (in)
Flow (cfs)
01Jan2015
Summary Results for Subbasin "Subbasin-C-1"
Project: Santolina Level B Simulation Run: 24 hr Full Build
Subbasin: Subbasin-C-1
Start of Run: 01Jan2015, 00:00
End of Run: 02Jan2015, 00:00
Compute Time: 21Jan2016, 08:59:00
Basin Model: Proposed Full Buildout
Meteorologic Model: 24hr
Control Specifications: 24 hr 2min
Volume Units: IN AC-FT
Computed Results
Peak Discharge: 760.4 (CFS)
Precipitation Volume: 57.7 (AC-FT)
Loss Volume: 14.6 (AC-FT)
Excess Volume: 43.1 (AC-FT)
Date/Time of Peak Discharge: 01Jan2015, 06:12
Direct Runoff Volume: 43.0 (AC-FT)
Baseflow Volume: 0.0 (AC-FT)
Discharge Volume: 44.1 (AC-FT)
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Subbasin-C-1 Result:Precipitation
Run:24 hr Full Build Element:Subbasin-C-1 Result:Precipitation Loss
Run:24 hr Full Build Element:Subbasin-C-1 Result:Outflow
Run:24 hr Full Build Element:Subbasin-C-1 Result:Baseflow

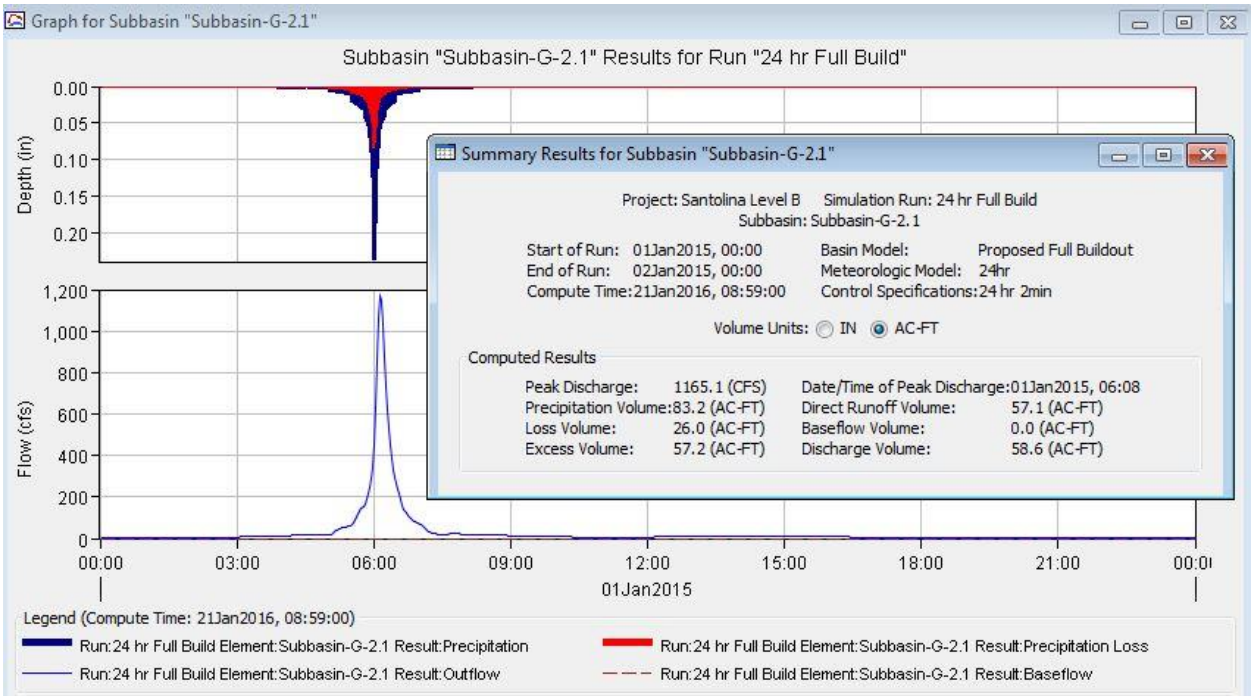

Graph for Subbasin "Subbasin-C-1"
Subbasin "Subbasin-C-1" Results for Run "24 hr Full Build"
Depth (in)
Flow (cfs)
01Jan2015
Summary Results for Subbasin "Subbasin-C-1"
Project: Santolina Level B Simulation Run: 24 hr Full Build
Subbasin: Subbasin-C-1
Start of Run: 01Jan2015, 00:00
End of Run: 02Jan2015, 00:00
Compute Time: 21Jan2016, 08:59:00
Basin Model: Proposed Full Buildout
Meteorologic Model: 24hr
Control Specifications: 24 hr 2min
Volume Units: IN AC-FT
Computed Results
Peak Discharge: 760.4 (CFS)
Precipitation Volume: 57.7 (AC-FT)
Loss Volume: 14.6 (AC-FT)
Excess Volume: 43.1 (AC-FT)
Date/Time of Peak Discharge: 01Jan2015, 06:12
Direct Runoff Volume: 43.0 (AC-FT)
Baseflow Volume: 0.0 (AC-FT)
Discharge Volume: 44.1 (AC-FT)
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Subbasin-C-1 Result:Precipitation
Run:24 hr Full Build Element:Subbasin-C-1 Result:Precipitation Loss
Run:24 hr Full Build Element:Subbasin-C-1 Result:Outflow
Run:24 hr Full Build Element:Subbasin-C-1 Result:Baseflow

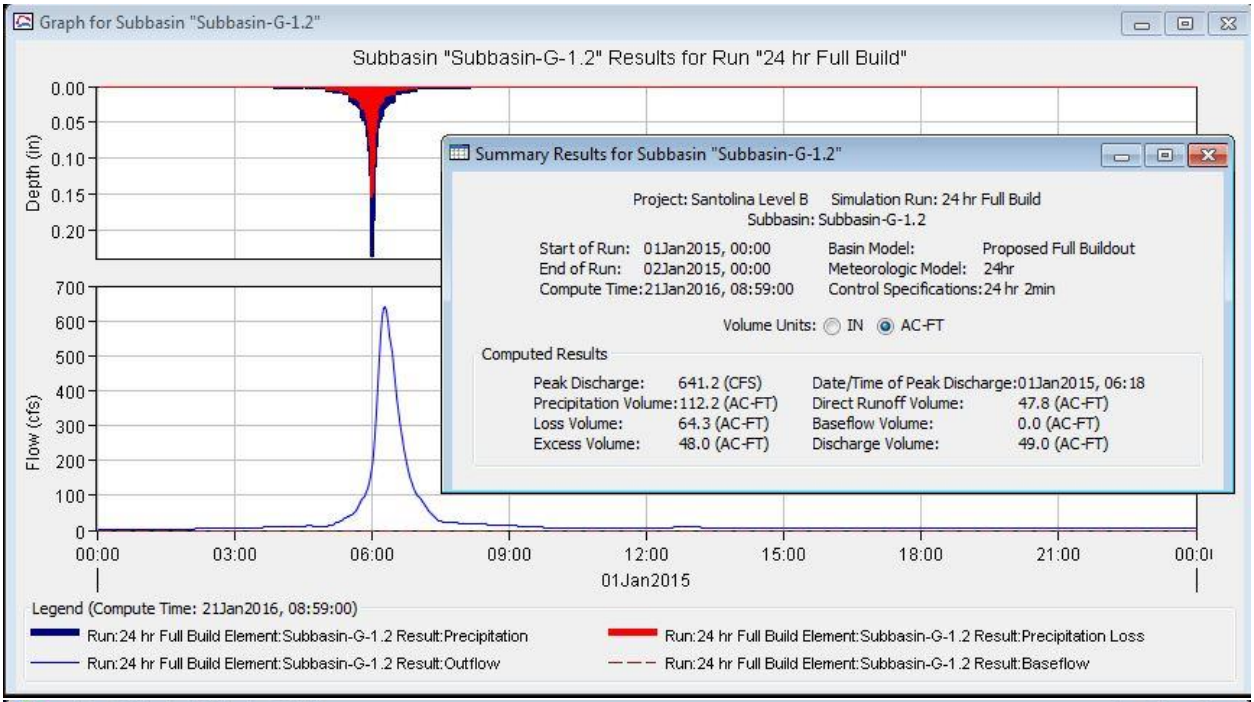

Graph for Subbasin "Subbasin-A"
Subbasin "Subbasin-A" Results for Run "24 hr Full Build"
Depth (in)
Flow (cfs)
01Jan2015
Summary Results for Subbasin "Subbasin-A"
Project: Santolina Level B Simulation Run: 24 hr Full Build
Subbasin: Subbasin-A
Start of Run: 01Jan2015, 00:00
End of Run: 02Jan2015, 00:00
Compute Time: 21Jan2016, 08:59:00
Basin Model: Proposed Full Buildout
Meteorologic Model: 24hr
Control Specifications: 24 hr 2min
Volume Units: IN AC-FT
Computed Results
Peak Discharge: 54.4 (CFS)
Precipitation Volume: 38.6 (AC-FT)
Loss Volume: 34.6 (AC-FT)
Excess Volume: 4.0 (AC-FT)
Date/Time of Peak Discharge: 01Jan2015, 06:10
Direct Runoff Volume: 4.0 (AC-FT)
Baseflow Volume: 0.0 (AC-FT)
Discharge Volume: 4.1 (AC-FT)
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Subbasin-A Result:Precipitation
Run:24 hr Full Build Element:Subbasin-A Result:Precipitation Loss
Run:24 hr Full Build Element:Subbasin-A Result:Outflow
Run:24 hr Full Build Element:Subbasin-A Result:Baseflow

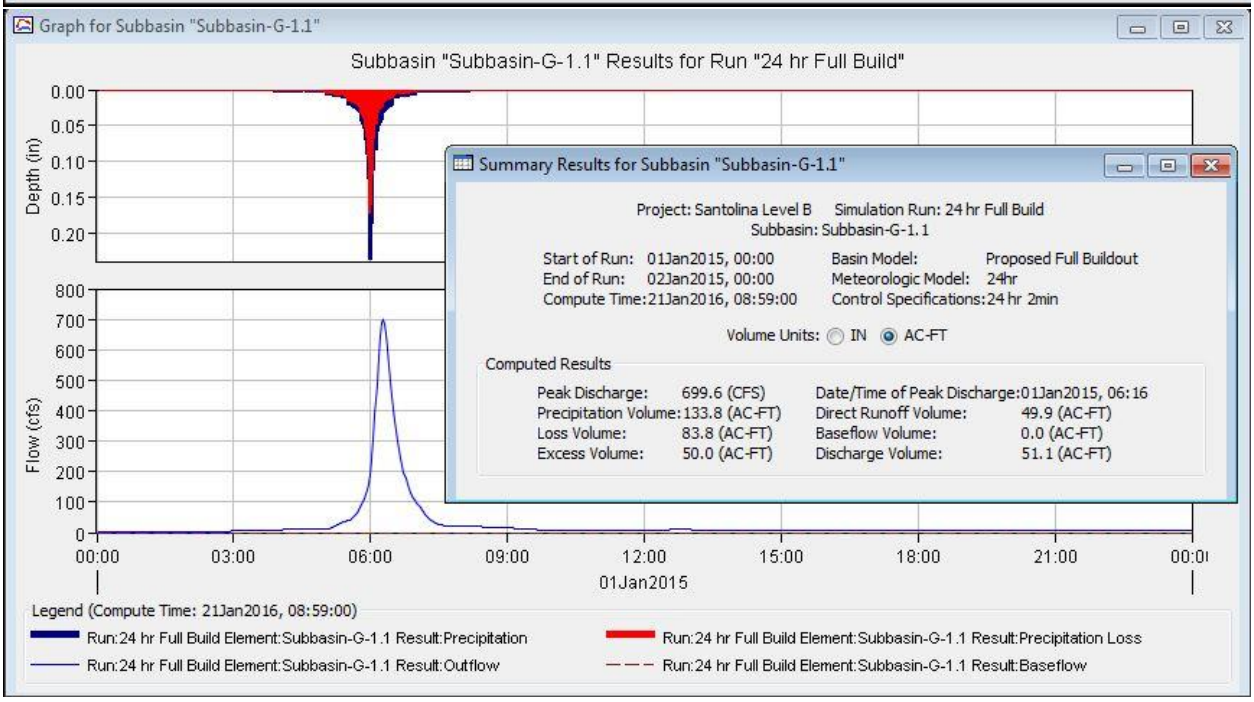

Graph for Subbasin "Subbasin-G-2.3"
Subbasin "Subbasin-G-2.3" Results for Run "24 hr Full Build"
Depth (in)
Flow (cfs)
01Jan2015
Summary Results for Subbasin "Subbasin-G-2.3"
Project: Santolina Level B Simulation Run: 24 hr Full Build
Subbasin: Subbasin-G-2.3
Start of Run: 01Jan2015, 00:00
End of Run: 02Jan2015, 00:00
Compute Time: 21Jan2016, 08:59:00
Basin Model: Proposed Full Buildout
Meteorologic Model: 24hr
Control Specifications: 24 hr 2min
Volume Units: IN AC-FT
Computed Results
Peak Discharge: 1965.4 (CFS)
Precipitation Volume: 170.1 (AC-FT)
Loss Volume: 34.8 (AC-FT)
Excess Volume: 135.3 (AC-FT)
Date/Time of Peak Discharge: 01Jan2015, 06:16
Direct Runoff Volume: 135.0 (AC-FT)
Baseflow Volume: 0.0 (AC-FT)
Discharge Volume: 138.3 (AC-FT)
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Subbasin-G-2.3 Result:Precipitation
Run:24 hr Full Build Element:Subbasin-G-2.3 Result:Precipitation Loss
Run:24 hr Full Build Element:Subbasin-G-2.3 Result:Outflow
Run:24 hr Full Build Element:Subbasin-G-2.3 Result:Baseflow

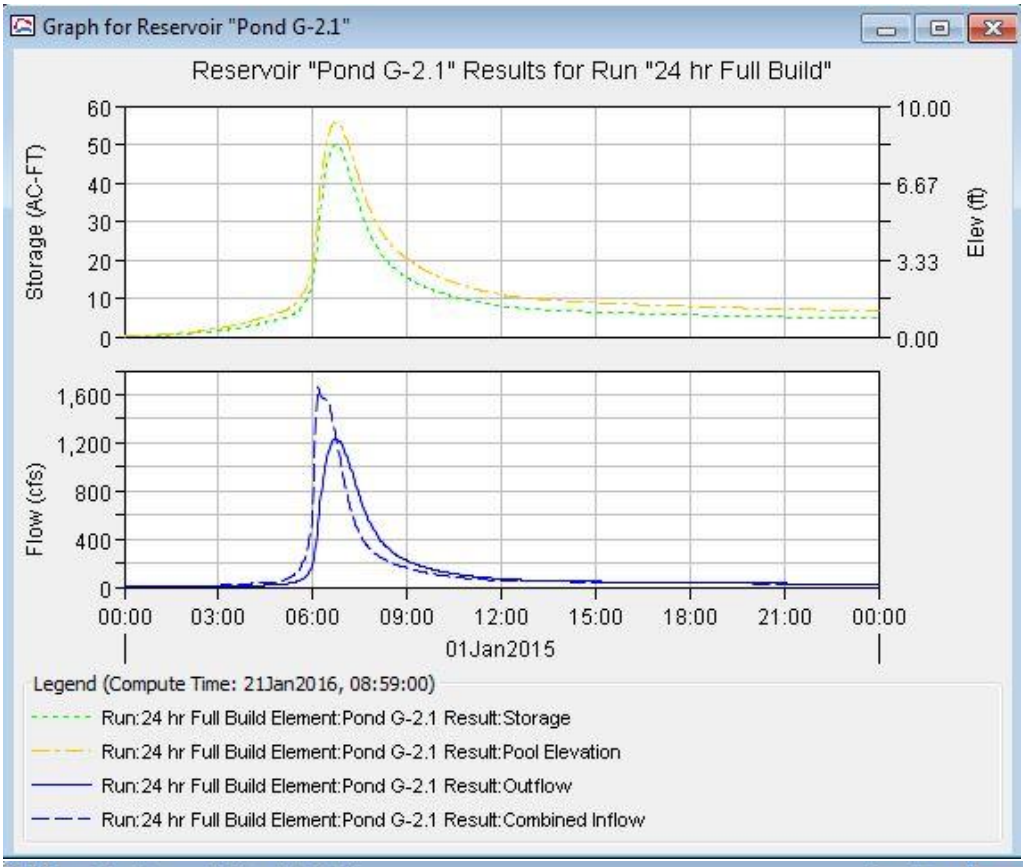

Graph for Subbasin "Subbasin-G-1.3"
Subbasin "Subbasin-G-1.3" Results for Run "24 hr Full Build"
Depth (in)
Flow (cfs)
01Jan2015
Summary Results for Subbasin "Subbasin-G-1.3"
Project: Santolina Level B Simulation Run: 24 hr Full Build
Subbasin: Subbasin-G-1.3
Start of Run: 01Jan2015, 00:00
End of Run: 02Jan2015, 00:00
Compute Time: 21Jan2016, 08:59:00
Basin Model: Proposed Full Buildout
Meteorologic Model: 24hr
Control Specifications: 24 hr 2min
Volume Units: IN AC-FT
Computed Results
Peak Discharge: 374.8 (CFS)
Precipitation Volume: 42.5 (AC-FT)
Loss Volume: 19.2 (AC-FT)
Excess Volume: 23.2 (AC-FT)
Date/Time of Peak Discharge: 01Jan2015, 06:14
Direct Runoff Volume: 23.2 (AC-FT)
Baseflow Volume: 0.0 (AC-FT)
Discharge Volume: 23.7 (AC-FT)
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Subbasin-G-1.3 Result:Precipitation
Run:24 hr Full Build Element:Subbasin-G-1.3 Result:Precipitation Loss
Run:24 hr Full Build Element:Subbasin-G-1.3 Result:Outflow
Run:24 hr Full Build Element:Subbasin-G-1.3 Result:Baseflow

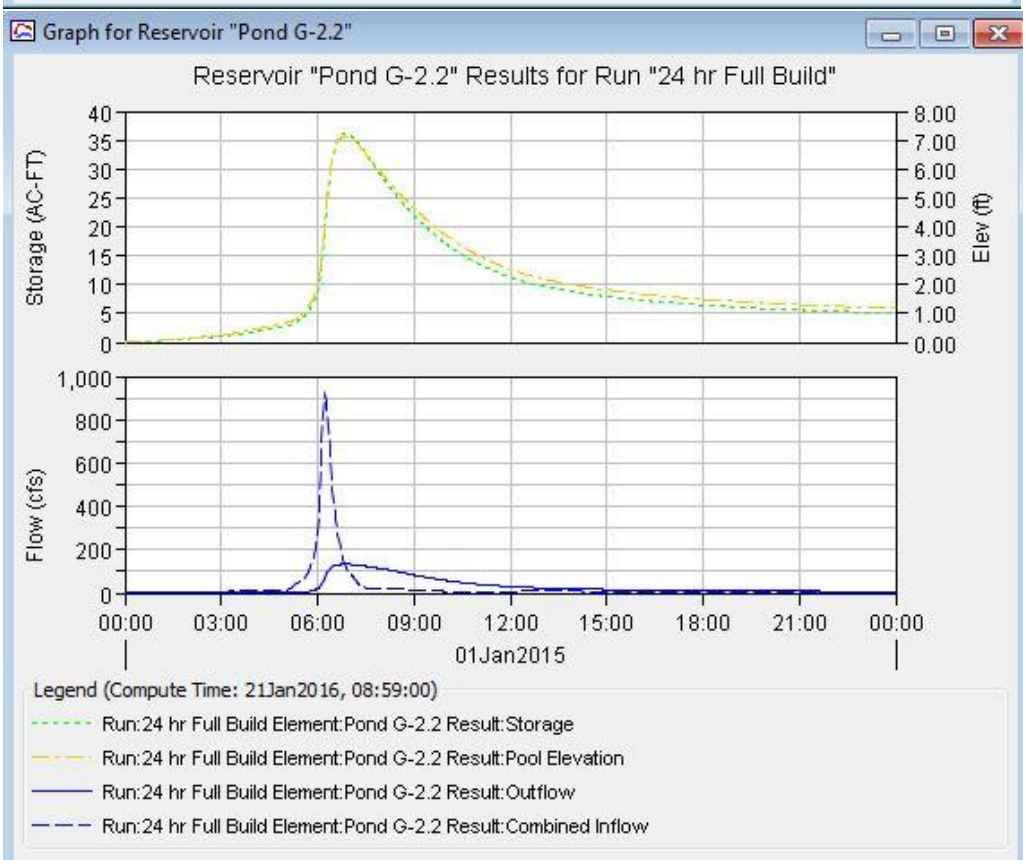

Graph for Subbasin "Subbasin-G-2.2"
Subbasin "Subbasin-G-2.2" Results for Run "24 hr Full Build"
Depth (in)
Flow (cfs)
01Jan2015
Summary Results for Subbasin "Subbasin-G-2.2"
Project: Santolina Level B Simulation Run: 24 hr Full Build
Subbasin: Subbasin-G-2.2
Start of Run: 01Jan2015, 00:00
End of Run: 02Jan2015, 00:00
Compute Time: 21Jan2016, 08:59:00
Basin Model: Proposed Full Buildout
Meteorologic Model: 24hr
Control Specifications: 24 hr 2min
Volume Units: IN AC-FT
Computed Results
Peak Discharge: 912.0 (CFS)
Precipitation Volume: 89.7 (AC-FT)
Loss Volume: 32.5 (AC-FT)
Excess Volume: 57.2 (AC-FT)
Date/Time of Peak Discharge: 01Jan2015, 06:14
Direct Runoff Volume: 57.0 (AC-FT)
Baseflow Volume: 0.0 (AC-FT)
Discharge Volume: 58.5 (AC-FT)
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Subbasin-G-2.2 Result:Precipitation
Run:24 hr Full Build Element:Subbasin-G-2.2 Result:Precipitation Loss
Run:24 hr Full Build Element:Subbasin-G-2.2 Result:Outflow
Run:24 hr Full Build Element:Subbasin-G-2.2 Result:Baseflow

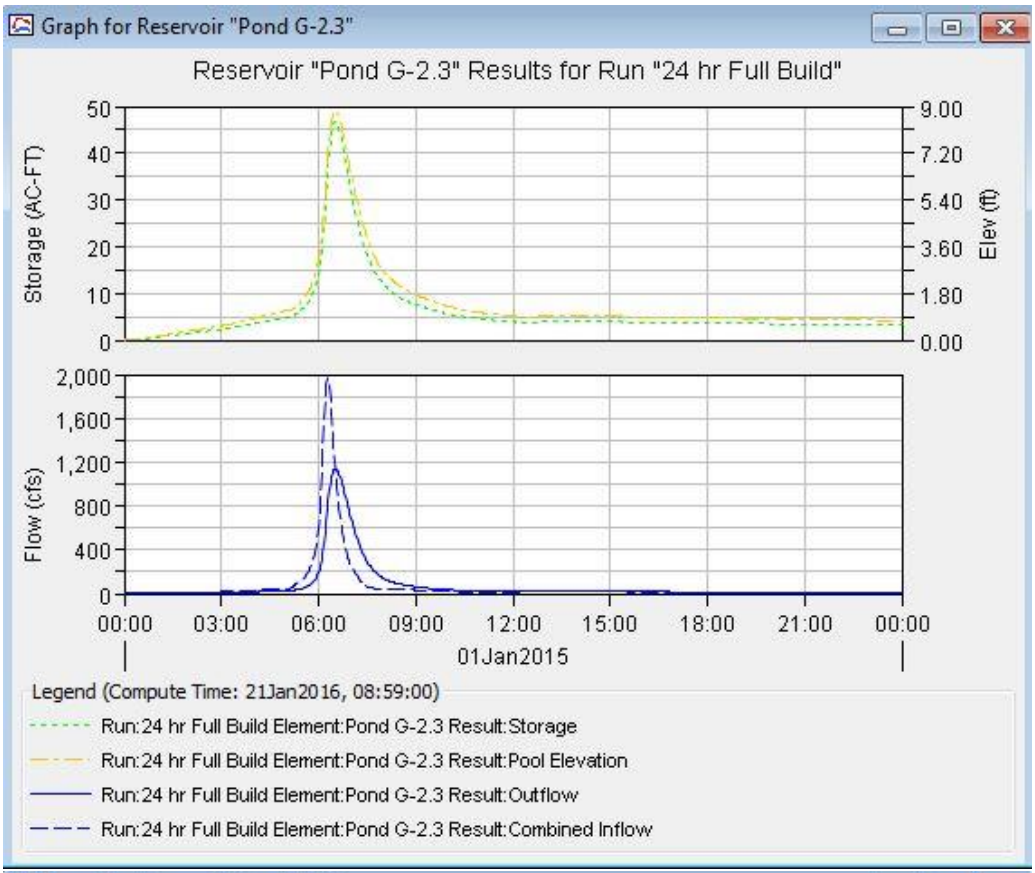

Graph for Subbasin "Subbasin-G-2.1"
Subbasin "Subbasin-G-2.1" Results for Run "24 hr Full Build"
Depth (in)
Flow (cfs)
01Jan2015
Summary Results for Subbasin "Subbasin-G-2.1"
Project: Santolina Level B Simulation Run: 24 hr Full Build
Subbasin: Subbasin-G-2.1
Start of Run: 01Jan2015, 00:00
End of Run: 02Jan2015, 00:00
Compute Time: 21Jan2016, 08:59:00
Basin Model: Proposed Full Buildout
Meteorologic Model: 24hr
Control Specifications: 24 hr 2min
Volume Units: IN AC-FT
Computed Results
Peak Discharge: 1165.1 (CFS)
Precipitation Volume: 83.2 (AC-FT)
Loss Volume: 26.0 (AC-FT)
Excess Volume: 57.2 (AC-FT)
Date/Time of Peak Discharge: 01Jan2015, 06:08
Direct Runoff Volume: 57.1 (AC-FT)
Baseflow Volume: 0.0 (AC-FT)
Discharge Volume: 58.6 (AC-FT)
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Subbasin-G-2.1 Result:Precipitation
Run:24 hr Full Build Element:Subbasin-G-2.1 Result:Precipitation Loss
Run:24 hr Full Build Element:Subbasin-G-2.1 Result:Outflow
Run:24 hr Full Build Element:Subbasin-G-2.1 Result:Baseflow

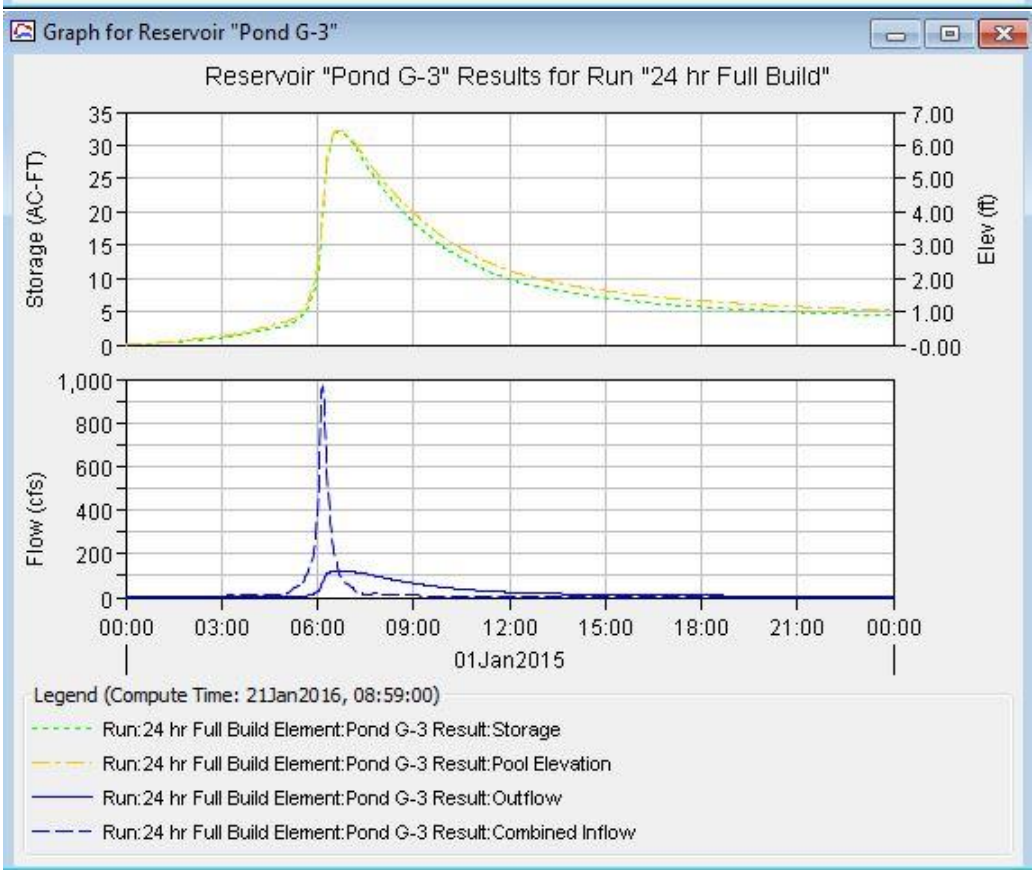

Graph for Subbasin "Subbasin-G-1.2"
Subbasin "Subbasin-G-1.2" Results for Run "24 hr Full Build"
Depth (in)
Flow (cfs)
01Jan2015
Summary Results for Subbasin "Subbasin-G-1.2"
Project: Santolina Level B Simulation Run: 24 hr Full Build
Subbasin: Subbasin-G-1.2
Start of Run: 01Jan2015, 00:00
End of Run: 02Jan2015, 00:00
Compute Time: 21Jan2016, 08:59:00
Basin Model: Proposed Full Buildout
Meteorologic Model: 24hr
Control Specifications: 24 hr 2min
Volume Units: IN AC-FT
Computed Results
Peak Discharge: 641.2 (CFS)
Precipitation Volume: 112.2 (AC-FT)
Loss Volume: 64.3 (AC-FT)
Excess Volume: 48.0 (AC-FT)
Date/Time of Peak Discharge: 01Jan2015, 06:18
Direct Runoff Volume: 47.8 (AC-FT)
Baseflow Volume: 0.0 (AC-FT)
Discharge Volume: 49.0 (AC-FT)
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Subbasin-G-1.2 Result:Precipitation
Run:24 hr Full Build Element:Subbasin-G-1.2 Result:Precipitation Loss
Run:24 hr Full Build Element:Subbasin-G-1.2 Result:Outflow
Run:24 hr Full Build Element:Subbasin-G-1.2 Result:Baseflow

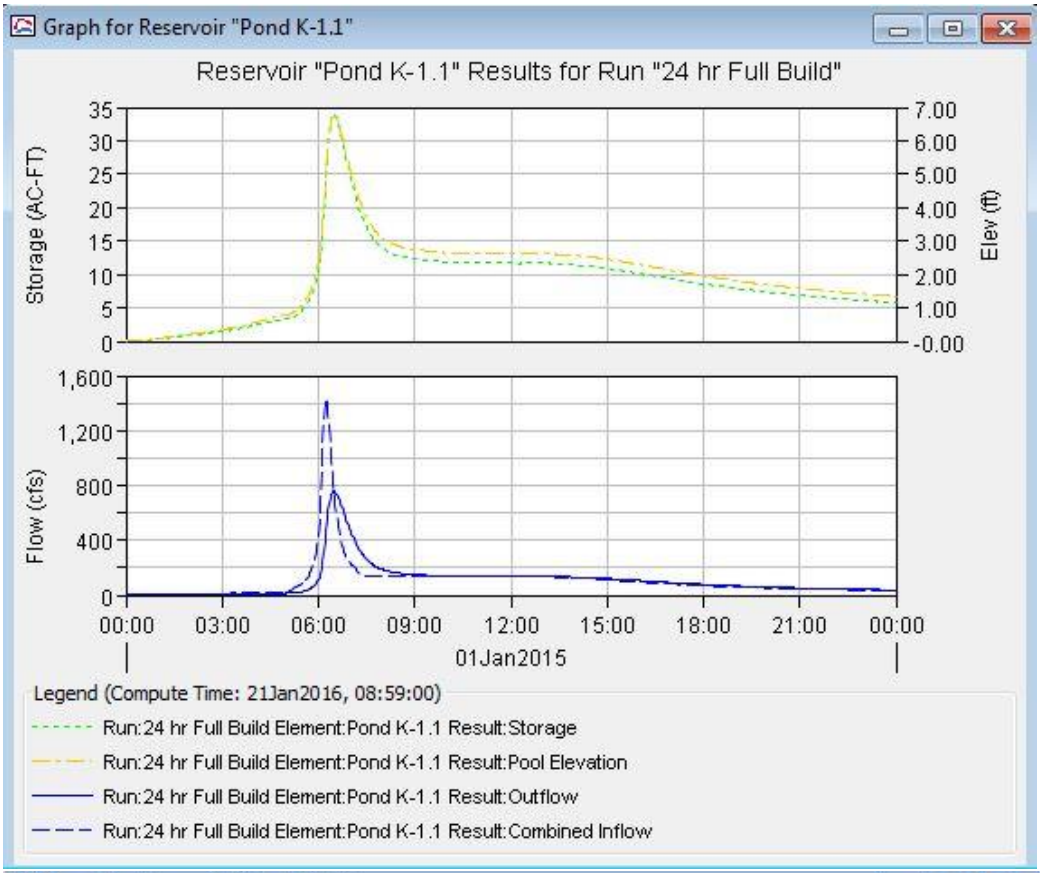

Graph for Subbasin "Subbasin-G-1.1"
Subbasin "Subbasin-G-1.1" Results for Run "24 hr Full Build"
Depth (in)
Flow (cfs)
01Jan2015
Summary Results for Subbasin "Subbasin-G-1.1"
Project: Santolina Level B Simulation Run: 24 hr Full Build
Subbasin: Subbasin-G-1.1
Start of Run: 01Jan2015, 00:00
End of Run: 02Jan2015, 00:00
Compute Time: 21Jan2016, 08:59:00
Basin Model: Proposed Full Buildout
Meteorologic Model: 24hr
Control Specifications: 24 hr 2min
Volume Units: IN AC-FT
Computed Results
Peak Discharge: 699.6 (CFS)
Precipitation Volume: 133.8 (AC-FT)
Loss Volume: 83.8 (AC-FT)
Excess Volume: 50.0 (AC-FT)
Date/Time of Peak Discharge: 01Jan2015, 06:16
Direct Runoff Volume: 49.9 (AC-FT)
Baseflow Volume: 0.0 (AC-FT)
Discharge Volume: 51.1 (AC-FT)
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Subbasin-G-1.1 Result:Precipitation
Run:24 hr Full Build Element:Subbasin-G-1.1 Result:Precipitation Loss
Run:24 hr Full Build Element:Subbasin-G-1.1 Result:Outflow
Run:24 hr Full Build Element:Subbasin-G-1.1 Result:Baseflow

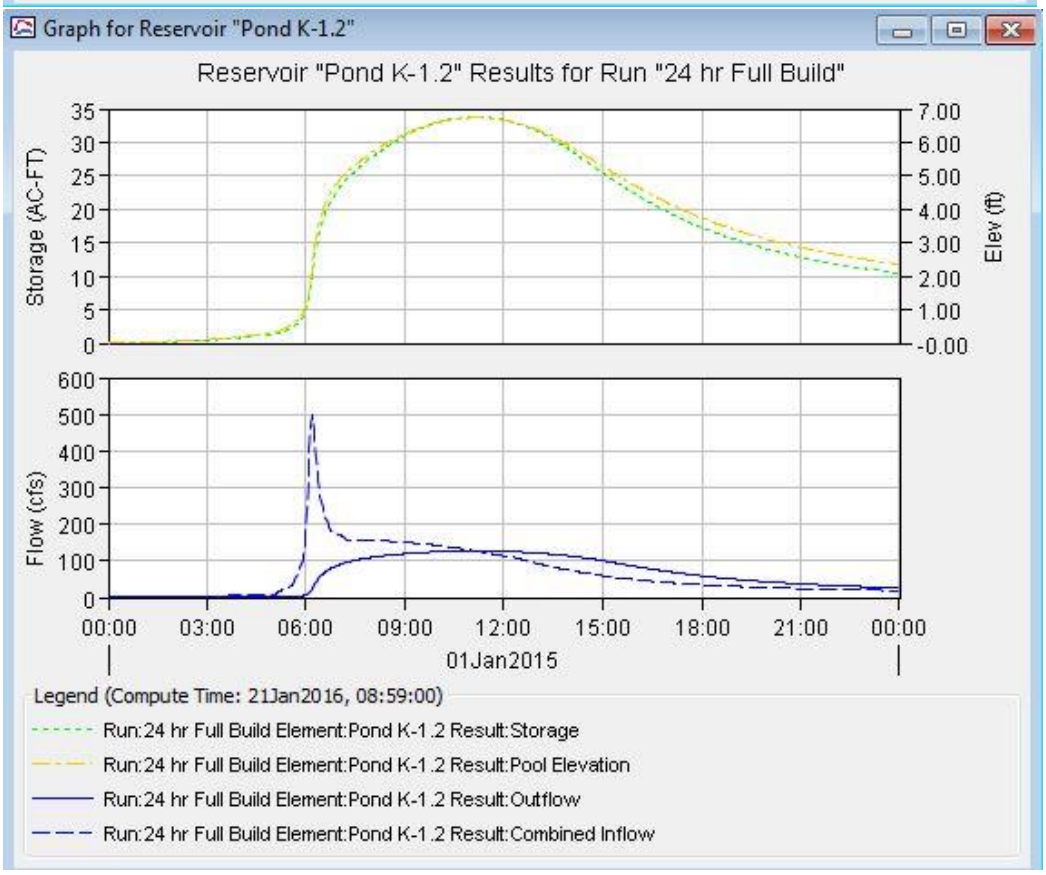

Graph for Reservoir "Pond G-2.1"
Reservoir "Pond G-2.1" Results for Run "24 hr Full Build"
Storage (AC-FT)
Elev (ft)
Flow (cfs)
01Jan2015
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Pond G-2.1 Result:Storage
Run:24 hr Full Build Element:Pond G-2.1 Result:Pool Elevation
Run:24 hr Full Build Element:Pond G-2.1 Result:Outflow
Run:24 hr Full Build Element:Pond G-2.1 Result:Combined Inflow

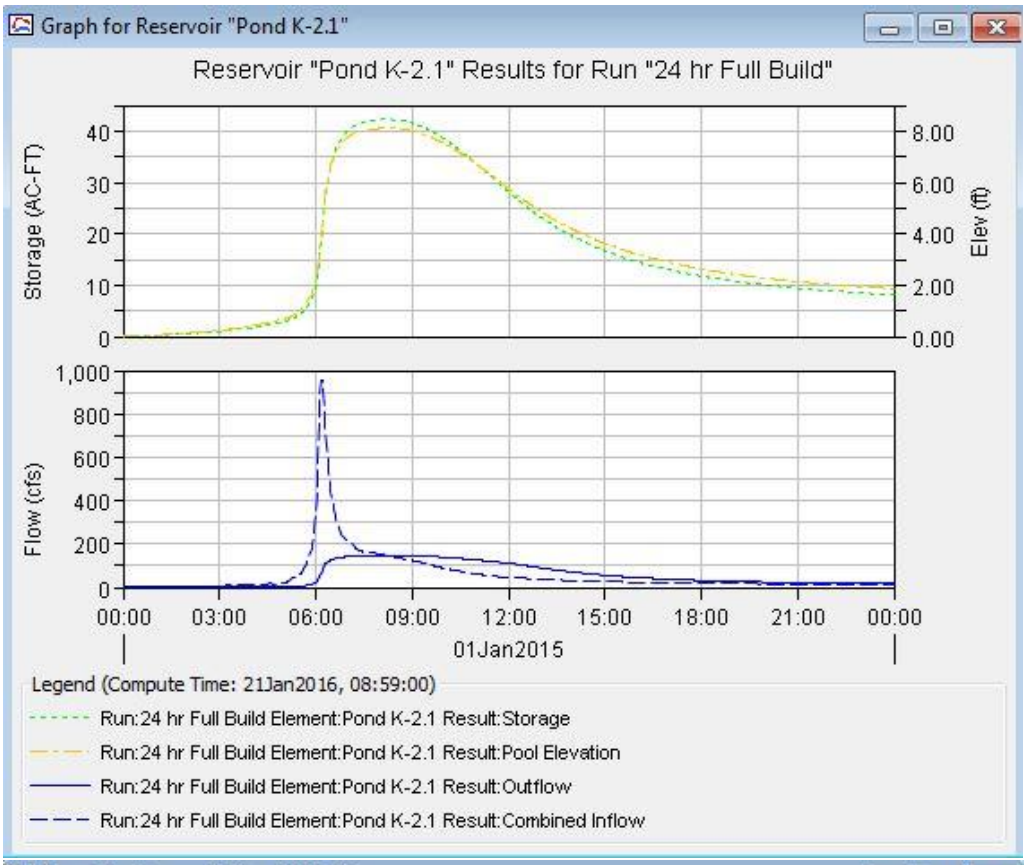

Graph for Reservoir "Pond G-2.2"
Reservoir "Pond G-2.2" Results for Run "24 hr Full Build"
Storage (AC-FT)
Elev (ft)
Flow (cfs)
01Jan2015
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Pond G-2.2 Result:Storage
Run:24 hr Full Build Element:Pond G-2.2 Result:Pool Elevation
Run:24 hr Full Build Element:Pond G-2.2 Result:Outflow
Run:24 hr Full Build Element:Pond G-2.2 Result:Combined Inflow

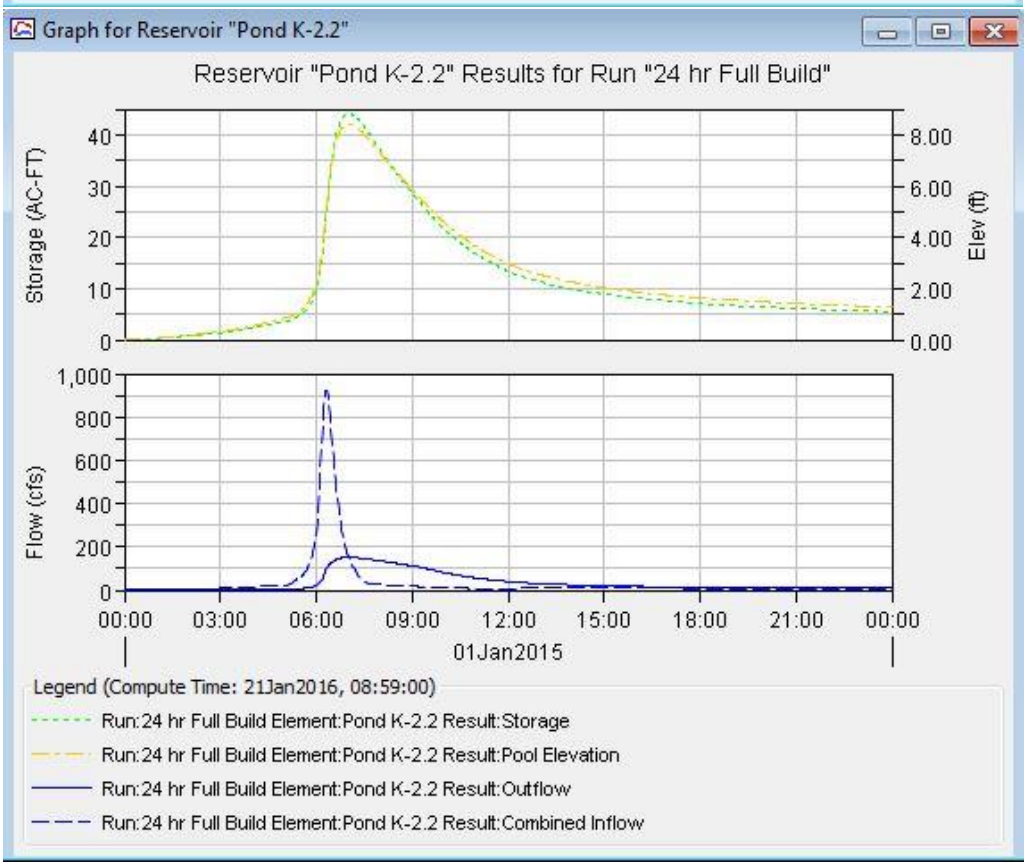

Graph for Reservoir "Pond G-2.3"
Reservoir "Pond G-2.3" Results for Run "24 hr Full Build"
Storage (AC-FT)
Elev (ft)
Flow (cfs)
01Jan2015
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Pond G-2.3 Result:Storage
Run:24 hr Full Build Element:Pond G-2.3 Result:Pool Elevation
Run:24 hr Full Build Element:Pond G-2.3 Result:Outflow
Run:24 hr Full Build Element:Pond G-2.3 Result:Combined Inflow


Graph for Reservoir "Pond G-3"
Reservoir "Pond G-3" Results for Run "24 hr Full Build"
Storage (AC-FT)
Elev (ft)
Flow (cfs)
01Jan2015
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Pond G-3 Result:Storage
Run:24 hr Full Build Element:Pond G-3 Result:Pool Elevation
Run:24 hr Full Build Element:Pond G-3 Result:Outflow
Run:24 hr Full Build Element:Pond G-3 Result:Combined Inflow


Graph for Reservoir "Pond K-1.1"
Reservoir "Pond K-1.1" Results for Run "24 hr Full Build"
Storage (AC-FT)
Elev (ft)
Flow (cfs)
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
01Jan2015
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Pond K-1.1 Result:Storage
Run:24 hr Full Build Element:Pond K-1.1 Result:Pool Elevation
Run:24 hr Full Build Element:Pond K-1.1 Result:Outflow
Run:24 hr Full Build Element:Pond K-1.1 Result:Combined Inflow


Graph for Reservoir "Pond K-1.2"
Reservoir "Pond K-1.2" Results for Run "24 hr Full Build"
Storage (AC-FT)
Elev (ft)
Flow (cfs)
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
01Jan2015
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Pond K-1.2 Result:Storage
Run:24 hr Full Build Element:Pond K-1.2 Result:Pool Elevation
Run:24 hr Full Build Element:Pond K-1.2 Result:Outflow
Run:24 hr Full Build Element:Pond K-1.2 Result:Combined Inflow


Graph for Reservoir "Pond K-2.1"
Reservoir "Pond K-2.1" Results for Run "24 hr Full Build"
Storage (AC-FT)
Elev (ft)
Flow (cfs)
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
01Jan2015
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Pond K-2.1 Result:Storage
Run:24 hr Full Build Element:Pond K-2.1 Result:Pool Elevation
Run:24 hr Full Build Element:Pond K-2.1 Result:Outflow
Run:24 hr Full Build Element:Pond K-2.1 Result:Combined Inflow

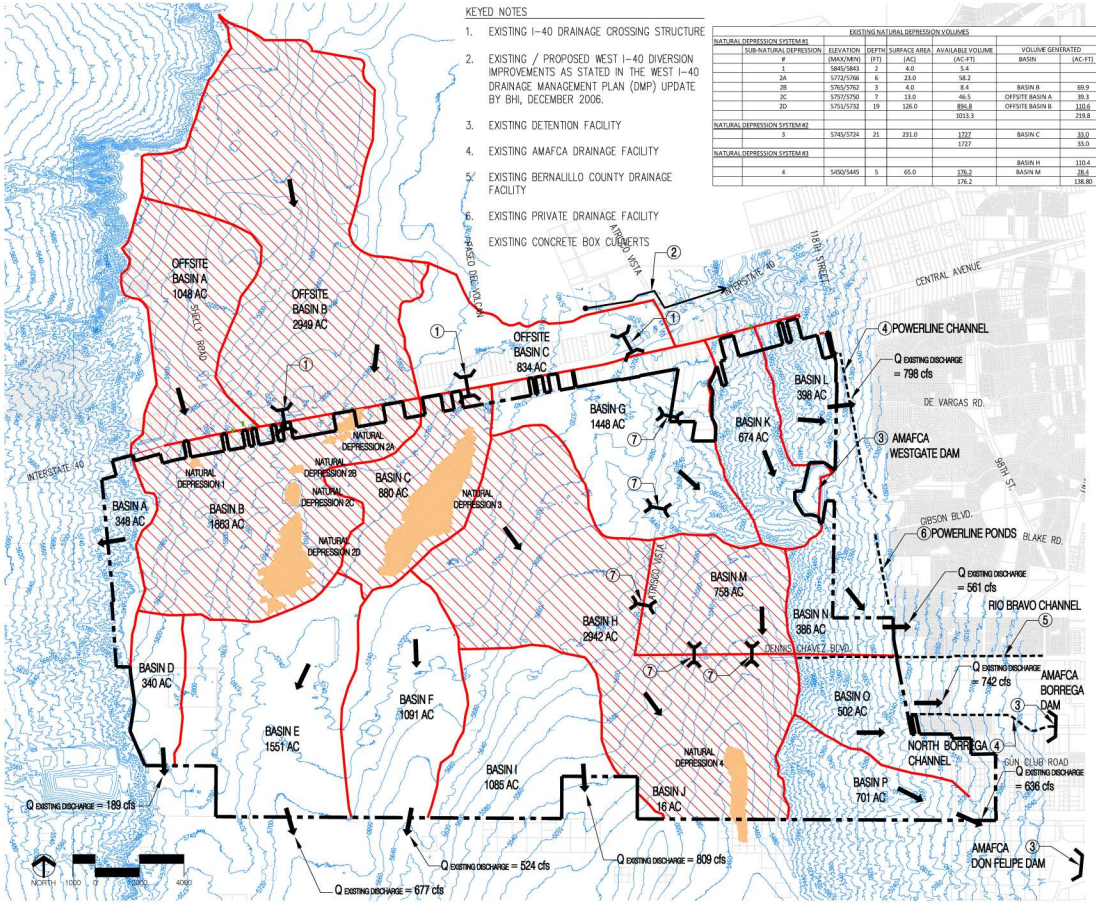

Graph for Reservoir "Pond K-2.2"
Reservoir "Pond K-2.2" Results for Run "24 hr Full Build"
Storage (AC-FT)
Elev (ft)
Flow (cfs)
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
01Jan2015
Legend (Compute Time: 21Jan2016, 08:59:00)
Run:24 hr Full Build Element:Pond K-2.2 Result:Storage
Run:24 hr Full Build Element:Pond K-2.2 Result:Pool Elevation
Run:24 hr Full Build Element:Pond K-2.2 Result:Outflow
Run:24 hr Full Build Element:Pond K-2.2 Result:Combined Inflow

APPENDIX C -
STORMWATER MANAGEMENT MASTER PLAN
EXISTING CONDITIONS

Bohannan Huston

FIGURE 1: STORMWATER MANAGEMENT MASTER PLAN

EXISTING CONDITIONS



KEYED NOTES

1. EXISTING I-40 DRAINAGE CROSSING STRUCTURE
2. EXISTING / PROPOSED WEST I-40 DIVERSION IMPROVEMENTS AS STATED IN THE WEST I-40 DRAINAGE MANAGEMENT PLAN (DMP) UPDATE BY BHI, DECEMBER 2006.
3. EXISTING DETENTION FACILITY
4. EXISTING AMAFCA DRAINAGE FACILITY
5. EXISTING BERNALILLO COUNTY DRAINAGE FACILITY
6. EXISTING PRIVATE DRAINAGE FACILITY
7. EXISTING CONCRETE BOX CULVERTS

EXISTING NATURAL DEPRESSION VOLUMES

NATURAL DEPRESSION SYSTEM #1							
	SUB-NATURAL DEPRESSION #	ELEVATION (MAX/MIN)	DEPTH (FT)	SURFACE AREA (AC)	AVAILABLE VOLUME (AC-FT)	VOLUME GENERATED BASIN	(AC-FT)
	1	5845/5843	2	4.0	5.4		
	2A	5772/5766	6	23.0	58.2		
	2B	5765/5762	3	4.0	8.4	BASIN B	69.9
	2C	5757/5750	7	13.0	46.5	OFFSITE BASIN A	39.3
	2D	5751/5732	19	126.0	896.8	OFFSITE BASIN B	110.6
					1013.3		219.8
NATURAL DEPRESSION SYSTEM #2							
	3	5745/5724	21	231.0	1727	BASIN C	33.0
					1727		33.0
NATURAL DEPRESSION SYSTEM #3							
						BASIN H	110.4
	4	5490/5445	5	65.0	176.2	BASIN M	28.4
					176.2		138.80

LEGEND

- EXISTING NATURAL DEPRESSION
- SITE LIMITS
- EXISTING BASIN BOUNDARY
- FLOW ARROW
- EXISTING CROSSING STRUCTURE
- WEST I-40 DIVERSION IMPROVEMENTS
- EXISTING DRAINAGE FACILITIES
- NATURAL DEPRESSION CONTROLLED BASINS

DRAINAGE BASIN CALCULATIONS - EXISTING CONDITIONS

BASIN I.D.	AREA (AC)	PEAK FLOW 100 YR - 6 HR (CFS)	VOLUME 100 YR - 24 HR (AC-FT)	VOLUME 100 YR - 10 DAY (AC-FT)
A	348	966	26.0	26.0
B	1863	963	69.9	69.9
C	880	576	33.0	33.0
D	340	189	12.8	12.8
E	1551	877	58.2	58.2
F	1091	524	40.9	40.9
G	1448	702	54.3	54.3
H	2942	1190	110.4	110.4
I	1085	809	40.7	40.7
J	16	21	0.6	0.6
K	674	1351	33.7	33.7
L	398	798	19.9	19.9
M	758	569	28.4	28.4
N	387	561	19.3	19.3
O	607	742	30.3	30.3
P	596	636	29.8	29.8
OFFSITE A	1048	511	39.3	39.3
OFFSITE B	2949	2113	110.6	110.6
OFFSITE C	834	986	56.8	71.6
TOTAL	19916	14874	914.9	829.7

SANTOLINA

LEVEL A MASTER PLAN

ANTIGUA LAND COMPANY

Prepared by:
Consensus Planning, Inc.
302 Eighth Street NW
Albuquerque, NM 87102

Bohannan Huston, Inc.
Courtyard 1, 7500 Jefferson NE
Albuquerque, NM 87109-4335

NOVEMBER 1, 2014

Mon, 3-Nov-2014 - 9:09:am, Plotted by: AROMERO
P:\2012025B\03P\Plans\General\Master Plan\StormMasterPlan_Existing_10-31-14.dwg