

APPENDIX A CHECKLIST AND STANDARD NOTES

A.1 STORM WATER MANAGEMENT PLAN CHECKLIST

To standardize the review process and minimize the time for approval by the city during review of the plat and construction drawings for a subdivision, a complete submittal regarding the analysis of existing drainage conditions and the design of modifications or new drainage facilities is necessary. The owner of the property to be developed is required by the Director of Public Works to provide, at the owner's expense and as a condition of construction plan approval, a storm water management report for the total development area to be ultimately constructed. The storm water management report shall contain all of the necessary support data, methodologies used in calculations, and conclusions. The checklist below will be used by the city reviewer as a guide during the evaluation of all storm water management reports submitted to the city. The purpose of the checklist is to expedite the review process for both the engineer and the city, and to aid the engineer in the preparation of reports for the city's review. The storm water management report shall be submitted to the Director of Public Works through the director of planning and development services prior to approval of any construction plans.



CITY OF SAN ANTONIO, DEPARTMENT OF PUBLIC WORKS
STORM WATER ENGINEERING REVIEW TEAM
Submittal Review Checklist /

Date: _____		Engr. of Record: _____		Contact _____																
Project: _____		Type / City Name: _____		Phone Number: _____																
ID No.: _____		Design Firm: _____		email: _____																
REVIEWER: _____			QA/QC: _____																	
Phone Number: _____			Team Leader: _____																	
			SWE ID: _____																	
SUBMITTAL TYPE Major Plat ☐ Minor Plat ☐ MDF/MPCD ☐ PUD ☐ Building Permit ☐ RIO Zoning Low Impact ☐ Development (LID) ☐ ☐			SUBMITTED / REVIEWED ☐ I. Storm Water Management Plan (SWMP) ☐ II. Construction Plans ☐ III. Plat ☐ IV. Floodplain Analysis ☐ ☐ CLOMR LOMR Other ☐ ☐ ☐ ☐																	
To expedite review, please reference all City approved Plans, Plats, Building Permits or Floodplain Analyses associated with this development. Please provide as much information as available. <table border="0" style="width: 100%;"> <tr> <th style="text-align: left;">Parent Projects:</th> <th style="text-align: left;">NUMBER</th> <th style="text-align: left;">NAME</th> <th style="text-align: left;">DATE</th> <th style="text-align: left;">Approved SWMP*</th> </tr> <tr> <td>MDP (MPCD)*:</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>PUD*:</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> </table> _____ Flood Study: _____ _____ Building Permits: _____ Site: _____ Foundation: ☐ _____ Shell: _____ ☐ _____ ☐ _____ ☐ _____ ☐						Parent Projects:	NUMBER	NAME	DATE	Approved SWMP*	MDP (MPCD)*:	_____	_____	_____	_____	PUD*:	_____	_____	_____	_____
Parent Projects:	NUMBER	NAME	DATE	Approved SWMP*																
MDP (MPCD)*:	_____	_____	_____	_____																
PUD*:	_____	_____	_____	_____																
*Approved Storm Water Management Plan with included <u>Adverse Impact Analysis</u>. (Please note that further adverse impact analysis may be required.) *MDP = Master Development Plan, MPCD = Master Planned Community District, PUD = Planned Unit Development																				
For Resubmittals: 1. Please respond to each set of the comments with a cover letter. Concurrent reviews require separate resubmittal packages. 2. Submit one (1) signed/sealed copy and one (1) digital copy in the resubmittal package accompanied by original redlines if applicable. Digital copies may be uploaded directly to BuildSA.																				

3. Include certification that no changes or additions were made to plans or the report other than those addressing said comments. If other changes were made, please include a description of those changes.

STAFF USE ONLY

I. Storm Water Management Plan (SWMP)

	N/A	Included	Complete	Incomplete	Comments
A. GENERAL					
1. Signed, sealed & bound Storm Water Management Plan (SWMP) (one (1) hard copy and one (1) digital copy)					
2. Introduction & Executive Summary of existing conditions, proposed project, and methods used for analysis					
3. Adverse Impact Statement: <i>"The increased runoff resulting from proposed development will not produce a significant adverse impact to other properties, habitable structures or drainage infrastructure systems to a point where one of the criteria outlined in section 4.3.1C of the SWDCM (UDC appendix H) are met. Downstream conditions (including actual curb depth) in this reach have been field verified by myself or members of my staff. Therefore, the owner requests to participate in the Regional Storm Water Management Program by paying a fee- in-lieu- of onsite detention."</i>					
4. Regional Storm Water Management Program Participation Form					
5. Project Location Map					
6. Digital Flood Insurance Rate Map (DFIRM) with site superimposed					
7. Grading Plan (Also required in construction plans) ☐ Lots grading properly according to FHA Lot Grading Type (A, B, C) ☐ Driveway Detail, reference to critical Type "C" lots ☐ Check T-intersections, cul-de-sacs, and knuckles to make sure runoff is contained in streets ☐ Interceptor channels are required when: o Offsite drainage area flowing onto site is greater than 3 acres, or o Offsite drainage area flowing onto site is greater than 2 average residential lot depths					
8. Aerial map ☐ To expedite review, delineate site boundaries, point where one of the criteria outlined in section 4.3.1C of the SWDCM (UDC appendix H) are met, all downstream storm water facilities and other pertinent physiographic information.					
9. Onsite Drainage Area Map(s) (to scale) for <u>Existing, Proposed, and Ultimate Conditions</u> : ☐ Show Time of Concentration (Tc) pathways ☐ Show individual and overall drainage areas for the site. Indicate area of each watershed ☐ Show computation points and points of discharge; Table of hydrologic calculations for each individual and cumulative drainage area and points of discharge. Include acreage, runoff coefficients, Tc values, and rainfall intensities for the 5, 25, & 100-yr storm events, as applicable.					
10. Overall Drainage Area Map(s) (to scale) for <u>Existing, Interim, Proposed, and Ultimate Conditions</u> : ☐ Include point where one of the criteria outlined in section 4.3.1C of the SWDCM (UDC appendix H) are met. (For lots less than three (3) acres in size adverse impact analysis need only extend to where tributary drainage areas equal to 100 acres) ☐ Show Time of Concentration (Tc) pathways ☐ Show individual and overall drainage areas for the site. Indicate area of each watershed ☐ Show computation points and points of discharge ☐ Table of hydrologic calculations for each individual and cumulative drainage area and points of discharge. Include acreage, runoff coefficients, Tc values, and rainfall intensities for the 5, 25, & 100-yr storm events, as applicable					
11. Impervious Cover Exhibit(s): Indicate existing and proposed impervious cover					
12. Floodplain Submittal is required if property is within, abutting, or adjacent to a floodplain, see Floodplain Section below.					
13. Verify if site is in a Mandatory Detention Area					
B. HYDROLOGY					
1. Description of Method for Hydrologic Analysis Detailed runoff calculations include: ☐ Hydrologic Calculation Methods (Reference Chapter 5, Hydrology): o Rational Method: Drainage area ≤ 200 acres ☐ Detailed Time of Concentration (Tc) calculations; ☐ Weighted runoff coefficients; Rainfall intensities; ☐ Peak flow for Q5, Q25, Q100 o SCS or other Hydrograph Method allowed for drainage areas > 20 acres and required for drainage areas > 200 acres ☐ Typical SCS programs used: HEC-HMS, Pond Pack, Hydraflow, XPStorm, etc. ☐ Provide all electronic files ☐ Detailed Time of Concentration/Lag Time calculations ☐ SCS curve number (CN) value: provide detailed calculations & Soil Survey Map or Geotechnical Report to support o Soil Survey Map of area (site delineated, soil type & acreage of each soil group) ☐ % Impervious Cover detailed calculations and exhibit					
☐ Verify rainfall depths ☐ Routing Values: Provide detailed calculations (types of routing are Modified Puls or Muskingum Cunge) o Verify Reach lengths for routing and velocities					
2. Table comparing the Existing, Proposed, & Ultimate Condition Peak Flows (5, 25 and 100yr)					

C. HYDRAULICS				
1. General: ☐ Storm water infrastructure for drainage areas < 100 ac, design for the Q25 ☐ For all storm water facilities with drainage area ≥ 100ac, design for Q100				
2. Street Capacity: ☐ Local 'A': Q5 contained within top of curb, Q25 contained within ROW ☐ Collector/Local 'B': Q25 contained within top of curb ☐ Primary/Secondary Arterial: Q25 contained within top of curb & one lane in each direction shall remain passable with a flow depth not to exceed 0.3 ft ☐ For drainage area > 100 acres, Q100 contained within top of curb. Use actual curb heights in calculations for existing				
3. Dead end street draining to unpaved surface: ☐ Runoff velocity < 6 fps. ☐ Ensure runoff will flow into drainage easement				
4. Storm Drain: ☐ Inlets designed for 25yr capacity ☐ HGL/EGL: provide detailed calcs (including junction losses). Show on S.D. profiles ☐ EGL: below top of curb and top of junction box or, if approved by City, specify bolted manhole covers. ☐ HGL: below gutter ☐ Min easement: 15 ft min or 6 ft from pipe limits ☐ Minimum Pipe Slope: 0.3% ☐ Minimum Cleaning Velocity: 3 fps for 5-yr (20% ac) storm ☐ Maximum Permissible Velocity: o Maximum Velocity for Trunk lines: 15 fps o Maximum Velocity for Laterals: No limit ☐ Slopes or velocities outside the allowable range may require additional certifications at permitting or final inspection and/or additional warranties. ☐ Reinforce Concrete Pipe required under public streets ☐ Pipe Diameter o Trunk Lines: Minimum 24 in diameter o Laterals and driveway crossings: <24 in diameter may be allowed on a case-by-case basis				
5. Channels: (provide detailed calculations) ☐ If Drainage area < 100ac : Contain W.S. for Q25 plus freeboard (see Table 9.3.14) ☐ If Drainage area ≥ 100ac : Contain W.S. for Q100 or Q25 plus freeboard, whichever is greater				
☐ Channel bend freeboard calculations (if centerline radius is < 3 times the bottom width) ☐ Verify if the channel has adequate drainage easement ☐ Include a channel maintenance schedule for new channels ☐ Verify Manning's Roughness Coefficient (n) (Reference Table 9.2.4.1) ☐ Earthen channel: o Verify 15 ft access easement on one side o Max shear stress as outlined in Section 9.3.8 o Pilot channel required if slope < 0.5% o Maximum 3:1 side slopes ☐ Concrete channel: o Verify 15 ft access easement on one side, 2 ft easement on the other o Minimum longitudinal slope: 0.4% or 0.1% with minimum cleaning velocity of 3 fps for existing Q5 o For trapezoidal channels, maximum 1.5:1 side slope without geotech design o Handrails or fencing required for channels with vertical walls or side slopes > 2:1 when wall height exceeds 2 ft o Check outfall velocities ☐ Side-Lot Flumes: o Public Easements: verify 10 ft access easement on one side, 2 ft easement on the other o Private Easements: verify 2 ft easement on either side o Slope and velocity requirements are the same as for concrete channels. ☐ Turf Reinforcement Matting: 6 fps < V < 12 fps. If > 12 fps, engineer's report should certify that material is appropriate for velocity. Include manufacturer spec's & installation instructions. Engineer to certify at final inspection that material was installed correctly. ☐ Interceptor channel: Drainage easement shall extend a min of 2 ft on both sides of the channel ☐ Handrails or fencing required on vertical headwalls greater than 2 ft in height and wing walls with slopes				
6. Outfalls / Outlets / Transitions ☐ When one channel discharges into another channel verify that storm water will be contained within the receiving channel. Verify that the outfall velocity into the receiving channel will not result in runoff jumping out of the receiving channel. ☐ Concrete rip rap or other velocity control/erosion protection measures may be required at pipe/channel and channel/channel intersections and transitions. ☐ If outfall velocity exceeds 6 fps at transition to earthen channel or other non-paved surface, provide energy dissipators or other velocity control measures o Verify that the proposed energy dissipator type is appropriate for the outfall conditions (Reference Chapter 10, Table 10.4.3) o Detailed calculations are required when energy dissipators are proposed o Provide retard spacing and concrete transition length where applicable ☐ Hydrograph timing & analysis of backwater may affect outfall and dissipator calculations				
D. ADVERSE IMPACT ANALYSIS				
1. Narrative ☐ Provide an Adverse Impact Analysis and an Adverse Impact Statement ☐ Discuss in detail the downstream conditions ☐ Discuss if drainage patterns have changed from the previously approved MDP, if applicable				
2. If site work permit ONLY with no increase in impervious cover – Demonstrate that drainage patterns are not obstructed. Grading plan required. Detailed adverse impact analysis may be required.				
3. Provide detailed hydrologic & hydraulic calculations from proposed development to a point where one of the criteria outlined in section 4.3.1C of the SWDCM (UDC appendix H) are met.				
4. Verify hydrologic calculation method				
5. Compare existing, proposed, and ultimate peak flows				

7. Street Capacity: ☐ Local 'A': Q5 contained within top of curb, Q25 contained within ROW ☐ Collector/Local 'B': Q25 contained within top of curb ☐ Primary/Secondary Arterial: Q25 contained within top of curb & one lane in each direction shall remain passable with a flow depth not to exceed 0.3 ft ☐ For drainage area > 100 acres, Q100 contained within top of curb. Use actual curb heights in calculations for existing streets (non-standard curbs, street overlays, etc.)					
8. Curb Inlets: ☐ Opening capacity detailed calculations for Q25 ☐ HGL/EGL: provide detailed calcs (including junction losses). ☐ EGL: below top of curb ☐ HGL: below gutter line					
9. Storm Drain: ☐ HGL/EGL: provide detailed calcs (show losses). Show on storm drain profiles. ☐ EGL: should be below junction box lid/manhole					
10. Channels: (provide detailed calculations for Ultimate Q & Channel Capacity): ☐ Contain ultimate Q25 plus freeboard or ultimate Q100, whichever is greater, within drainage easement/ROW & does not flood habitable structures.					
11. Culvert: ☐ Runoff should not overtop an existing structure under the roadway for the existing, proposed, and ultimate of the 5, 25, & 100 yr condition OR ... ☐ A new culvert should be designed for the 25 yr ultimate for drainage areas ☐ 100 acres or 100- year for drainage areas greater than 100 acres					
12. Low Water Crossings (Provide detailed calculations and discuss): ☐ Low Water Crossing must not be classified as "Dangerous" during regulatory (5, 25, or 100 yr frequency) storm events ☐ If the WSE exceeds this criterion the crossing may be improved in lieu of providing onsite mitigation measures or paying a fee-in-lieu of detention. This is to be considered on a case by case basis and may require a developer agreement.					
13. Underground Utilities in Floodplain: ☐ Provide buoyancy and scour calculations for the 5, 25, and 100 yr storm events ☐ Show any required concrete capping or encasement in construction plans					
E. DETENTION					
1. Provide Drainage Area Map(s) (to scale) for Existing and Proposed Conditions: ☐ Also include ultimate conditions, if applicable (phased construction, basin serving multiple lows, etc.) ☐ Include Time of Concentration/Lag time flow paths ☐ Modified Rational Method may be used for drainage areas up to 20 acres ☐ SCS Method to be used for drainage areas > 20 acres (i.e. HEC-HMS, Pond Pak, Hydraflow, etc.) ☐ SCS Method to be used for modeling multiple ponds, regardless of drainage area					
2. Provide results in tabular format with detailed calculations for allowable/existing, proposed, and ultimate discharges from the structure					
3. Post- development discharges from the pond for the <u>1</u> , 5, 25, and 100 yr must be equal to or less than existing conditions					
4. Provide inflow and outflow hydrographs for <u>1</u> , 5, 25, and 100 yr (proposed, ultimate)					
5. Provide required storage for the <u>1</u> , 5, 25, and 100 yr (proposed, ultimate)					
6. Include stage vs. discharge and stage vs. storage tables					
7. Provide outlet rating curve					
8. Provide Pondpack, Hydraflow Hydrographs, or other applicable calculation files on CD					
9. Verify if pond qualifies as a TCEQ dam. (Reference Chapter 13 for dam requirements)					
10. Verify basin side slopes: ☐ Maximum 3:1 for earthen berm/side slopes ☐ Concrete side slopes/walls may require structural details or geotech analysis depending on slope and height (see <u>concrete channel wall requirements</u>)					
11. Check hydraulics of outlet structure: ☐ Verify weir and orifice size(s) and elevation(s) ☐ Check effect of tail water elevation on outfall hydraulics ☐ Outfall velocity: Max Shear stress as outlined in Section 9.3.8 ☐ Provide energy dissipation if needed (include calculations and construction details)					
12. Verify design water surface elevations are below the top of pond: ☐ 100 yr proposed/ultimate or 25 yr proposed/ultimate plus freeboard ☐ 100 yr 6 hr duration proposed/ultimate check ☐ If TCEQ dam, provide auxiliary spillway					
13. Restrictor plates may be required for ponds with phased development					
14. Provide pond grading on subdivision plat					
15. Provide detention pond construction plans (signed & sealed), including but not limited to: ☐ Pond grading ☐ Notes for establishing vegetation ☐ Pond details, including cross-sections with design water surface elevations ☐ Outfall structure (pipe, weir, etc.) details ☐ Restrictor plate details, as applicable					
16. Deferred Detention: ☐ Detailed detention analysis and construction of ponds may be allowed on a case by case basis ☐ Preliminary detention calculations are still required at platting					

17. Regional Storm Water Detention Facilities: ☐ Provide 15 ft easement around top of bank and/or 100 yr flood inundation pool for maintenance [and public safety] purposes				
18. Public Detention Facilities: ☐ Provide access ramps with a maximum slope of 7:1 for access to the flow line of the facility (also recommended for private facilities)				
19. Provide a signed Maintenance Agreement				
20. Drainage Easements for Detention Ponds: ☐ Show detention pond easements on the plat when the detention is being designed and constructed as part of the plat ☐ Detention pond easements generally shall not be provided on the plat when detention is deferred				
21. Detention Pond Conformance Letter: ☐ Submit letter to Public Works after pond is constructed ☐ Plat recordation, building permit approval, or certificate of occupancy may be withheld until letter is submitted by applicant and accepted by Public Works ☐ Plat recordation will not be withheld when deferring detention				
F. 2-DIMENSIONAL MODELING				
1. Is the Model Approved by FEMA ☐ Is the computer program used for 2D hydraulic modeling approved by FEMA? FEMA has approved the use of 2D software for 1D riverine flood routing (channel flow) and 2D unconfined flood routing. FEMA Region approval is needed for other uses.				
2. Provide Version of Model used.				
3. If effective model was 1D, does the report clearly establish that the effective methodology was inappropriate for the study reach?				
4. If effective model was 1D, was a duplicate effective model submitted?				
5. Submit all the model layer files used to develop the model input.				
6. Does the model(s) run from the digital medial or with a provided free viewer?				
7. Is the 2D domain development methodology documented and compliant with modeling software recommendations?				
8. Does the 2D domain extend beyond the project area? Development and derivation of the grid/mesh must be clearly documented in the report.				
9. Provide source of the Digital Terrain Model and confirm it covers the entire project area.				
10. Are the time step and grid cell size reasonable for the modeled area? Was a geo-referenced geometry file submitted for the model domain?				
11. Are ineffective flow areas reasonably represented?				
12. Confirm that n-values used in the model reasonable?				
13. Provide a narrative on how the boundary conditions were determined?				
14. Provide documentation in the report that the model conserves volume.				
G. OTHER				

STAFF USE ONLY

II. CONSTRUCTION PLANS

For Residential Plats or Non-Residential Permits. Refer to Standard Details and Design Guidance Manual

	N/A	Included	Complete	Incomplete	Comments
A. STREET PLANS					
1. Signed and sealed Construction Plans ☐ Submit one (1) hard copy and one (1) digital copy with original submittal and resubmittals; ☐ Once the plans are approved, additional hard copies of the plans may be requested for distribution to the City inspectors.					
2. Slope to inlet: min = 0.5% ; max = 4% ☐ Positive drainage provided to all inlets, including those located at the low point of (i.e. in the sag of) a vertical curve					
3. Provide flow arrow for washout crowns					
4. Provide flow arrows and detailed grading at T-intersections, cul-de-sacs, and knuckles as needed to make sure runoff is contained in streets					
B. DRAINAGE PLANS					
1. Signed and sealed Construction Plans ☐ Submit one (1) hard copy and one (1) digital copy with original submittal and resubmittals; ☐ Once the plans are approved, additional hard copies of the plans may be requested for distribution to the City inspectors.					

☐ Standard notes: ☐ Improved earthen channels and detention ponds will be vegetated by seeding or siding. Eighty five percent (85%) of the channel surface area must have established vegetation before the City of San Antonio will accept the channel for maintenance ☐ All concrete lining shall develop a minimum compressive strength of not less than 3,000 psi in 28 days ☐ For normal conditions, the concrete lining shall be a minimum of five (5) inches thick and reinforced with No. 4 round bars @ 18 inches on center each way or welded wire fabric of 6"x6" – W/D6 x W/D6 . Where surcharge, nature of ground, height and steepness of slope, etc. become critical, design shall be in accordance with latest structural standards. All concrete lining shall develop a minimum compressive strength of not less than three thousand (3,000) pounds per square inch in twenty-eight (28) days. The depth of all toe downs shall be 36 inches upstream, 24 inches downstream, and 18 inches for side slopes. The City's Construction				
Inspector may permit an 18" toe down in rock sub grade in lieu of the above toe down requirements. The horizontal dimensions of toe downs shall not be less than six (6) inches. ☐ Please provide one (1) of the following standard notes on the general notes sheet of the construction plan set, whichever is applicable: - o The resulting adverse impact analysis, drainage patterns, runoff and volume calculations associated with this phase of development is consistent with the Stormwater Management Plan developed for the Master Development Plan submitted and approved on (<i>Provide MDP Number and Date</i>). - o The resulting adverse impact analysis, drainage patterns, runoff and volume calculations associated with this phase of development is not consistent with the Stormwater Management Plan developed for the Master Development Plan submitted and approved on (<i>Provide MDP Number and Date</i>). A revised Stormwater Management Plan has been submitted on (<i>Provide date</i>) that reflects these construction plans and is subject to review before these plans will be accepted by the City.				
2. Interim Conditions and Detention Pond Notes. Use the first note and either the second or third note as applicable. Contractor shall phase construction and/or provide necessary BMPs to mitigate interim conditions runoff during construction due to clearing, grading, subgrade preparation, paving, buildings, etc., and to prevent adverse impacts to other property, structures, and infrastructure during construction. Detention pond excavation and/or embankment necessary for providing storage must be substantially complete prior to City inspection of street subgrade, curb, flex base, and pavement within the watershed draining to the detention pond. Detention pond excavation and/or embankment necessary for providing storage must be substantially complete prior to construction of flex base, pavement, pouring building slabs, or constructing other impervious cover within the watershed draining to the detention pond(s). Contact Transportation & Capital Improvements (Public Works) for a site inspection.				
3. Storm Drain: ☐ Minimum easement required (15ft) or 6 ft from extreme limits of pipe ☐ Minimum 2' vertical/horizontal clearance between storm drain pipes and other utilities, or provide concrete encasement				
4. Junction box: ☐ Minimum 6 in clearance from O.D. of pipe to inside of junction box wall ☐ Invert of junction box to be shaped with concrete fill (2,500 psi min) to ensure drainage to outlet pipe				
C. STANDARD DETAIL SHEETS				
1. Junction Box: ☐ Check for standard junction box detail ☐ If proposed span larger than standard, reinforcement and concrete wall thickness calculations and a signed and sealed detail must be provided				
2. Curb inlets shall be per City standard details. Inlet extensions are acceptable as follows: ☐ Maximum of one (1) extension allowed for inlets on grade ☐ Inlet extensions are typically not allowed for sump inlets ☐ If proposing multiple extensions on grade or extensions for sump inlets, additional capacity calculations or non-standard detailed drawings may be required				
3. Pipe Bedding and Backfill Details (<i>See special detail</i>) ☐ Note on 2nd layer (Rocks not larger than 1 in)				
4. Provide concrete collars at all tie-ins				
5. Grout should be added to spring line				
6. Weep Holes: ☐ Required in rip rap and on headwalls 5ft and higher ☐ Place weep holes 6" above the toe at 10 ft o.c. ☐ Geo-fabric is to be placed behind the riprap to hold the gravel (1 cubic foot per weep hole)				
D. UTILITY LAYOUT				
1. Lateral tie-ins from properties to public storm drain systems ☐ Laterals < 24 in may be approved on a case by case basis				
2. Utilities in the Floodplain: ☐ Check if any proposed underground utility lines are in floodplain ☐ Buoyancy and scour calculations may be required ☐ Concrete capping or encasement may be required				
E. GRADING PLAN				

1. Grading Plan: ☐ Lots grading properly according to FHA Lot Grading Type (A, B, C) ☐ Driveway Detail, reference to critical Type "C" lots ☐ Check T-intersections, cul-de-sacs, and knuckles to make sure runoff is contained in streets ☐ Interceptor channels are required when: ○ Offsite drainage area flowing onto site is greater than 3 acres, or ○ Offsite drainage area flowing onto site is greater than 2 average residential lot depths					
2. Include Interim Conditions and Detention Pond Notes from Section II.B.2 if applicable.					
F. OTHER					

STAFF USE ONLY

III. PLAT

	N/A	Included	Complete	Incomplete	Comments
A. GENERAL					
1. Provide one (1) hard copy and one (1) digital copy of the Subdivision Plat					
2. Existing Contours					
3. Finished/proposed Contours: ☐ Street only if no significant site grading ☐ Provide detention pond contours on plat, unless detention is deferred					
3. Label & dimension all drainage easements ☐ Public easements: ≥100 acre drainage area or conveying runoff from public ROW or facilities; and/or containing FEMA floodplain ☐ Private easements: <100 acre drainage area and/or not conveying runoff from public ROW or facilities, except for some side-lot flumes ☐ Side-lot flumes: 10 ft access required for public easements; minimum 2 ft either side of channel for private easements					
4. Verify continuation of Streets & Channels					
5. Delineate DFIRM 100 Yr Floodplain ☐ Provide drainage easement to include the worst case of the FEMA 100 yr and the lesser of the Ultimate 100 yr or the Ultimate 25 yr plus freeboard floodplain or a combination thereof					
6. Easement Requirements: ☐ Easements will be required for all detention facilities accepting runoff from properties other than the lot on which the detention pond exists or will be constructed. When detention is deferred, in lieu of providing an easement on the plat, Public Works may require that a note be placed on the plat specifying which lot(s) will provide detention for other lots. Public Works may require that an easement be established by separate instrument at building permit. ☐ For regional detention facilities the easement shall extend to a minimum of fifteen feet outside both the 100 yr pool and the structural improvements to facilitate maintenance as well as public safety.					
7. Notes: ☐ Include MDP Consistency Note from Section II.B.1 if applicable. ☐ Include Interim Conditions and Detention Pond Notes from Section II.B.2 if applicable.					
B. NOTES					
1. Common Area Maintenance Note: The maintenance of all private streets, open space, greenbelts, parks, tree save areas, including Lot , Block , CB or NCB , drainage easements and easements of any other nature within this subdivision shall be the responsibility of the Property Owners, or the Property Owners' Association, or its successors or assigns and not the responsibility of the City of San Antonio or Bexar County.					
San Antonio (Public Works) and Bexar County Floodplain Notes. Use Note #2 and choose one of notes 3 - 5) if the property contains floodplain. Use note #6 if the property does not contain floodplain. Minor variations may be approved by Public Works or Bexar County.					
2. Easements for Floodplains 35-F124(C) The drainage easements were delineated to contain the lesser of the boundaries of the 1% annual chance (100-year) flood zone established by the Federal Emergency Management Agency (FEMA) in accordance with DFIRM Panel , dated ; or the 1% annual chance (100-year) ultimate development condition water surface elevation; or the 4% annual chance (25-year) ultimate development floodplain plus freeboard. Construction, improvements, or structures within the drainage easements and floodplain are prohibited without prior written approval from the Floodplain Administrator of the City of San Antonio or Bexar County.					
3. LOMRs with FEMA Approval 35-F132 The 1% annual chance (100-Year) floodplain limits shown on this plat were delineated based upon a Letter of Map Revision (LOMR) Study prepared by and approved by FEMA on (Case No.). Floodplain information is subject to change as a result of future FEMA Map revisions and/or amendments.					

4. CLOMRs with FEMA Approval 35-F132 The 1% annual chance (100-year) floodplain limits shown on this plat were delineated based upon a Conditional Letter of Map Revision (CLOMR) Study prepared by _____ and approved by FEMA on _____. (Case No. _____). Floodplain information is subject to change as a result of future FEMA Map revisions and/or amendments.				
5. CLOMRs Pending FEMA Approval Lots thru _____, Block _____, CB or NCB _____, lie within the FEMA 1% annual chance (100-year) floodplain as depicted on the FEMA Flood Insurance Rate Map of Bexar County, Texas, DFIRM panel numbers 48029c and 48029c, dated _____. A FEMA CLOMR floodplain study has been prepared by and was _____				
_____ approved by the city of San Antonio and/or Bexar County. The floodplain study (FEMA Case No. _____) is pending approval by FEMA. Floodplain information is subject to change as a result of future FEMA Map revisions and/or amendments.				
6. Floodplain Verification No portion of the FEMA 1% annual chance (100-year) floodplain exists within this plat as verified by FEMA Map Panel: 48029C _____, effective [date]. Floodplain information is subject to change as a result of future FEMA Map revisions and/or amendments.				
Additional Floodplain and Storm Water Notes 7 - 15 to be used with the Floodplain Notes above if applicable:				
7. County Finished Floor Elevation- Relative to Floodplain F-142(a) & (b)1 Finished floor elevations for structures on lots containing floodplain or adjacent to the floodplain shall be in compliance with the floodplain regulation in effect at time of construction. Contact Bexar County Public Works for more information.				
8. Residential Finished Floor Appendix H. 15.2 and Appendix H. Appendix A.1.III.A.8 Residential finished floor elevations must be a minimum of eight (8) inches above final adjacent grade. <i>(This note is required on all residential and OCL plats)</i>				
9. Residential Finished Floor Elevation – City Only. Required for lots containing, adjacent to, or				
10. Non-Residential Finished Floor Elevation – City Only. Required for lots containing, adjacent to, or abutting floodplain. F124(f)(17) & F142(b) Finished floor elevations for non-residential structures shall be no less than one foot above the base flood elevation of the regulatory floodplain (City of San Antonio ultimate development floodplain). The lowest adjacent grade shall be at or above the base flood elevation. Flood-proofing may be allowed if elevating the structure is not feasible, if approved by the Floodplain Administrator of the City of San Antonio.				
11. Detention for previously recorded plat.				
Storm water detention is required for this property and is accounted for in an offsite detention pond located in Lot _____, Block _____, CB or NCB _____, Subdivision Unit _____, recorded in Volume _____, Page _____ (Plat # _____).				
12. Drainage Easement Encroachments Appendix H. Appendix A.1.III.A.7 No structure, fences, walls or other obstructions that impede drainage shall be placed within the limits of the drainage easements shown on this plat. No landscaping or other type of modifications, which alter the cross-sections of the drainage easements, as approved, shall be allowed without the approval of the Director of Public Works. The City of San Antonio and Bexar County shall have the right of ingress and egress over the grantor's adjacent property to remove any impeding obstructions placed within the limits of said drainage easement and to make any modifications or improvements within said drainage easements.				
13. TCI Public Works Detention & Maintenance Appendix H. 4.7.1 Storm water detention is required for property within the boundary of this plat. Building permits shall be issued only in conjunction with necessary storm water detention approved by the City of San Antonio Floodplain Administrator. The property may be eligible to post a fee in lieu of detention (FILO) if offsite drainage conditions allow but only when approved by the City of San Antonio Floodplain Administrator. Maintenance of on-site storm water detention shall be the sole responsibility of the property owners and/or the property owners' association and its successors or assigns and is not the responsibility of the City of San Antonio or Bexar County.				
14. LID - Voluntary 35-210(b)(4)F The property owner has elected to provide low impact development (LID) and/or natural channel design (NCD) on Lot(s) _____, Block _____, NCB _____. Building permits for this property shall be issued only in conjunction with necessary LID/NCD plans approved by the City of San Antonio. The property may be eligible for credit and offset incentives and/or fee incentives when approved by the City of San Antonio. If the property owner elects not to provide LID and/or NCDP, the incentives will not be granted and the property shall conform to all applicable development standards of the City Code Chapter 35, the Unified Development Code.				
15. LID – Mandatory Areas 35-673(c)(8) Low impact development (LID) and/or natural channel design (NCD) is required on lot(s) _____, block _____, NCB _____. Building permits for this property shall be issued only in conjunction with necessary LID/NCD plans approved by the City of San Antonio. The property may be eligible for credit and offset incentives and/or fee incentives when approved by the City of San Antonio.				
16. NOTE: Temporary easement to expire upon incorporation into platted public street ROW.				
23. Easement Requirements: ☐ Easements will be required for all detention facilities accepting runoff from properties other than the lot on which the detention pond exists or will be constructed. When detention is deferred, in lieu of providing an easement on the plat, Public Works may require that a note be placed on the plat specifying which lot(s) will provide detention for other lots. Public Works may require that an easement be established by separate instrument at building permit. ☐ For regional detention facilities the easement shall extend to a minimum of fifteen feet outside both the 100 yr pool and the structural improvements to facilitate maintenance as well as public safety.				
B. OTHER				

					STAFF USE ONLY
IV. FLOODPLAIN SUBMITTAL	N/A	Included	Complete	Incomplete	Comments
A. COSA FLOODPLAIN STUDY					
1. Provide one (1) hard copy and one (1) digital copy of signed and sealed floodplain study.					
2. Narrative: ☐ Cover Page, Table of Contents, and Executive Summary ☐ Introduction that includes project description and history, location, scope and objective of analysis, previous and related studies that may affect this analysis (other LOMC's in area) ☐ Identification and specific location of any increases in water surface elevations, velocities, or changes in the floodplain. Include discussion of how these changes meet Code and are being mitigated. ☐ Section on the topographic data, survey, and rainfall data utilized for the study. ☐ Section on the methodology used and any hydrologic or hydraulic parameters changed and justification. ☐ Summary, conclusions, and recommendations (if applicable). Include the impact on the flows, water surface elevations, & velocities. ☐ Comparison tables between pre-project and post-project/proposed conditions. For new or changes to hydrology, include a Flow Summary Table including the HMS junction name (if applicable) and cross section flows are being applied in the hydraulic model. For hydraulic result tables, include water surface elevations, velocities and include the Ultimate Development (UD) condition.					
3. Provide analysis of the following: ☐ 25 yr existing and ultimate development plus required freeboard condition hydrologic and hydraulic analyses ☐ 100 yr existing and ultimate development condition hydrologic and hydraulic analyses					
4. Vicinity/Location map					
☐ Submit a 1-page location map with latest aerial background that includes a box around the development, the location of any major project features, such as new ponds, bridges, culvert crossings, etc. Include political boundaries including city limits and the San Antonio ETJ. Include major stream names and road names in the area, labeled. The map should include a title, north arrow, scale, and legend.					
5. Overall Aerial Drainage Area Map(s) (signed and sealed): ☐ Show Time of Concentration (Tc) pathways ☐ Show individual and overall drainage areas. Indicate area of each watershed ☐ Show computation points and points of discharge ☐ Submit Soils and Landuse Maps that include color-coded landuse with corresponding impervious cover percentage for both pre-project and proposed/post-project conditions. Include additional copies for the Ultimate Development condition.					
6. Topographic Work Map(s) (signed and sealed): ☐ Scale the workmap to be able to read individual 1' contours clearly. It may be necessary to submit multiple sheets, depending on the size of the revision. ☐ Pre-project (Existing conditions) work map; showing existing contours, plan view of project limits, effective/existing cross sections, effective floodplain limits, property lines, limits of study/tie-in locations, etc. ☐ Post-project (proposed or as-built conditions) work map; showing existing contours, plan view of project limits, effective/existing cross sections, effective floodplain limits, property lines, limits of study/tie-in locations, etc. ☐ Include legend, scale, north arrow, vertical datum, source and date of survey and topographic data.					
7. Grading Plan existing and proposed/asbuilt 1' contours) signed and sealed, see Section II.E . Include location of proposed velocity-control and bank armoring/reinforcement features					
8. Channel Cross Sections (existing superimposed on proposed) show the drainage easement, Manning's coefficients, property lines, structures, etc.)					
9. Plotted water surface profiles for the ultimate flows (if applicable)					
10. Easement for Floodplain ☐ Provide drainage easement to include the worst case of the FEMA Effective and the greater of the Regulatory 100 yr or the Regulatory 25 yr plus freeboard floodplain or a combination thereof ☐ Drainage easements that include FEMA effective floodplain shall be noted as public easements on plats and other documents.					
11. Provide detailed Hydrology calculations , see checklist Section I.B.					
12. Modeling software cross-section plots & profiles ☐ Output plots showing cross section and profile plots with water surface elevation lines					
13. Output table (or tables) of the hydrologic & hydraulic model(s)					
14. Channel outfalls perpendicular to the floodplain: ☐ Channel outfall must meet the requirements in Section 9.3.17 – Channel Junctions. ☐ 36 in toe-down required. ☐ Floodplain development permit is required if within the city limits					

16. Describe if the FIS flow change locations are preserved if there is an effective FEMA model?					
17. Digital shapefile (projected in State Plane South Central) data of all HEC-HMS, HEC-RAS, XP-SWMM, and/or other models used in analyses.					
18. CD of all HEC-HMS, HEC-RAS, XP-SWMM, and/or other models used in analyses Digital copies may be uploaded directly to BuildSA					
19. Is this development over the Edwards Aquifer Recharge Zone?					
20. Flood plain Development Permit Application (1 copy)					
21. Elevation Certificates (if applicable)					
22. Unflooded vehicular access must be available to the development from a public street.					
23. If site is in ETJ, Bexar County is the Floodplain administrator ☐ COSA Floodplain Development Permit is not required ☐ Coordinate necessary forms and submittal requirements with the County ☐ Bexar County signs the FEMA forms ☐ Verify drainage easement for ultimate conditions					
24. Contour Data: ☐ 1 ft Lidar contours, field verification is required ☐ Onsite survey preferred, provide survey					
25. Floodplain Reclamation: ☐ Account for storage volume lost (with comparable excavation within the same creek floodplain) when reclamation of ineffective flow OR shallow flooding (overbank) areas is proposed ☐ If more than 320 acres drain to site, improvements to site may require an administrative exception					
26. Master Development Plans (MDP): ☐ Provide hydraulic analysis of floodplains that are adjacent to this MDP or if no hydraulic study is being done provide the following note on the MDP with signatures of the Owner and Engineer: "The Floodplain limits on this Master Development Plan are estimated and subject to change. Approval of subdivision plats associated with this Master Development Plan is subject to the review and approval of a Storm Water Management Plan in accordance with the City of San Antonio Unified Development Code." ☐ Note that MDP's are conceptual in nature and ONLY conditional approvals shall be given. One condition is that at the time of platting, more detailed downstream analysis will be provided by the engineer. ☐ If the SWMP Report requires updating during submittal for plat or construction plan review, the adverse impact conditions in 4.3.1(C) shall be validated for the area being modified. The updated report must comply with the current Floodplain management requirements as adopted in UDC Section 35-F100.					
B. FEMA CLOMR / LOMR					
1. Provide the applicable items listed in the COSA Floodplain Study above. Initiate the study on the San Antonio River Authority (SARA), D2MR website ☐ d2mr.sara-tx.org ☐ Register/login, select stream, click "Create Study" ☐ For all hydrology and hydraulic modeling please refer to SARA's San Antonio River Basin Modeling Standards (SARB)					
2. MT-2 Form 1, Sec D: ☐ Provide Owners and Engineer's original signature					
3. MT-2 Form 2, Sec A: ☐ Provide an attached explanation if sediment transport is not considered					
4. MT-2 Form 2, Sec B.4: ☐ Model names in this section must match the models listed in the CD					
5. Detailed Map Revision Study: ☐ Include 10, 50, 100, 100-year regulatory and 500 year analyses					
6. If applicable, provide As-Built Grading Plan with engineer's seal and signature. ☐ Provide an exhibit detailing areas of excavation and fill with supporting volume calculations to provide proof in support of the compensatory storage requirement					
7. Recommend providing Check-RAS output					
8. Provide models for effective, corrected effective, proposed, and ultimate (future) conditions					
9. Provide an Annotated FIRM ☐ see MT-2 Instructions for requirements					
10. Provide existing and proposed FEMA DFIRM Maps with the following: ☐ Existing – Label Map "Effective" and show the site boundaries ☐ Proposed – Label Map "Revised/ Proposed", show site boundaries, show only the proposed floodplain limits, floodplain must tie in with the existing floodplain upstream and downstream, show the proposed streets centerline only and label, show the upstream and downstream limits of study					
11. Verify that Environmental Site Assessment (ESA) has been submitted (COSA will not review)					
12. Digital model data of all HEC-HMS, HEC-RAS, XP-SWMM, and/or other models used in analyses. Submit digital data to the Floodplain Manager/LOMC reviewer.					
C. OTHER					