AMENDED AND RESTATED

## MASTER ECONOMIC DEVELOPMENT AGREEMENT (TRADITIONS PROJECT)

## TABLE OF CONTENTS

## Page

I. DEFINITIONS ..... 2
Section 1.01 Approved Master Drainage Plan ..... 2
Section 1.02 Approved Master Plan ..... 2
Section 1.03 CC\&Rs ..... 2
Section 1.04 Central Property ..... 2
Section 1.05 Club ..... 2
Section 1.06 Club Development Fee ..... 2
Section 1.07 Club Owner ..... 2
Section 1.08 Clubhouse ..... 2
Section 1.09 Commercial Development ..... 2
Section 1.10 Development Unit ..... 2
Section 1.11 Force Majeure Event ..... 3
Section $1.12 \quad$ Golf Course Property ..... 3
Section 1.13 Initial Lot ..... 3
Section 1.14 Initial Purchaser(s) ..... 3
Section 1.15 Land ..... 3
Section 1.16 Lot ..... 3
Section 1.17 Major Project Improvements ..... 3
Section 1.18 Neighborhood Subdivision Improvements ..... 3
Section 1.19 Net Sale Proceeds ..... 3
Section 1.20 Parcel ..... 4
Section 1.21 Parcel Sales ..... 4
Section $1.22 \quad$ Partnership ..... 4
Section 1.23 Planned Community ..... 4
Section 1.24 Project ..... 4
Section 1.25 Residential Community ..... 4
Section 1.26 TIF ..... 4
Section 1.27 Trade Consideration ..... 4
Section 1.28 Trade Lot ..... 4
Section 1.29 Trade Program ..... 4

## TABLE OF CONTENTS <br> (continued)

## Page

II. CITY AND BCDI OBLIGATIONS ..... 4
Section 2.01 Local Government Corporation ..... 4
Section 2.02 TIF ..... 5
Section 2.03 Construction and Maintenance of Major Project Improvements ..... 5
Section 2.04 Negative Covenants ..... 5
Section 2.05 Acquisition by TAP of Additional Land ..... 5
Section 2.06 Partnership ..... 5
Section 2.07 Parcel 35 ..... 5
Section 2.08 Adjacent Property ..... 6
Section $2.09 \quad$ Clubhouse Construction Fees ..... 7
Section 2.10 Access/Streets/Tunnel/Easement ..... 7
Section 2.11 Public Hotel Financing ..... 7
Section 2.12 City of College Station Land ..... 7
Section 2.13 Power Lines ..... 7
III. TAP'S OBLIGATIONS ..... 7
Section 3.01 Development Services ..... 7
Section 3.02 Governance Framework ..... 8
IV. REGULATIONS APPLYING TO DEVELOPMENT ..... 8
Section 4.01 Subdivision Regulations and Public Improvement Specifications Applicable to Development ..... 8
Section 4.02 Zoning ..... 8
Section 4.03 Permitting. ..... 8
Section 4.04 Approval of Master Plan ..... 8
Section 4.05 Master Drainage Plan ..... 9
V. EXTENSION OF CITY WATER AND WASTEWATER ..... 9
Section 5.01 Easements for Utilities ..... 9
Section 5.02 Design and Capacity of the City Improvements ..... 9
VI. TRADE PROGRAM ..... 10
Section 6.01 Trade Program ..... 10

## TABLE OF CONTENTS

 (continued)Page
VII. TERM/TERMINATION/SURVIVAL/DEFAULT ..... 10
Section 7.01 Term of Agreement ..... 10
Section 7.02 Rights and Remedies ..... 10
VIII. ADDITIONAL PROVISIONS ..... 11
Section 8.01 Amendments ..... 11
Section 8.02 Entire Agreement ..... 11
Section 8.03 Notices ..... 11
Section $8.04 \quad$ Savings and Severability ..... 12
Section 8.05 Applicable Law ..... 12
Section 8.06 Agreement Binding on Successors ..... 12
Section 8.07 Non-Waiver ..... 13
Section 8.08 Warranty of Capacity ..... 13
Section 8.09 Time is of the Essence ..... 13
Section $8.10 \quad$ Change of Address ..... 13
Section 8.11 Execution of Multiple Counterparts ..... 13
Section 8.12 Additional Instruments ..... 13
Section 8.13 Memorandum of Agreement ..... 13
Section 8.14 Parcels ..... 13
Section 8.15 Exhibits and Schedules ..... 13

## AMENDED AND RESTATED MASTER ECONOMIC DEVELOPMENT AGREEMENT (TRADITIONS PROJECT)

This Amended and Restated Master Development Agreement ("Agreement") is executed to be effective this 14 day of Octobev, 2009, by and between the City of Bryan, a Texas home rule city ("City"), Bryan Commerce and Development, Incorporated, a Texas local government corporation ("BCDI"), and Traditions Acquisition Partnership, L.P., a Texas limited partnership ("TAP") (the foregoing parties shall sometimes be collectively referred to herein as the "Parties" or individually as a "Party").

## RECITALS:

WHEREAS, the City and Melrose Community Properties, L.P. ( $\mathrm{f} / \mathrm{k} / \mathrm{a}$ Jordan Community Properties, L.P.), a Texas limited partnership ("MCP"), entered into that certain Master Economic Development Agreement dated November 2, 1999, as amended, supplemented and modified as of the date hereof (the "Original MEDA"), for the purpose of developing certain real property located in Brazos County, Texas more particularly described therein.

WHEREAS, pursuant to the Original MEDA, the City acquired certain land (as more particularly described therein) in Brazos County, Texas, and conveyed such land to BCDI for the purposes contemplated under the Original MEDA;

WHEREAS, BCDI, TAP and Bryan/Traditions, LP, a Texas limited partnership ("B/T"), have entered into that certain Traditions Development Agreement of even date herewith (the "Development Agreement") pursuant to which certain easements, obligations and other matters regarding the relationship between the Residential Community (defined below) and the Golf Course Property (defined below) are set forth;

WHEREAS, TAP has acquired all of the interests of MCP in and to the Original MEDA and that certain Residential Development Agreement dated October 26, 2000, and all of the interest of Traditions Club by Melrose, LLC, a Texas limited liability company in and to that certain Development and Purchase and Sale Agreement dated November 2, 1999, as amended, supplemented and modified from time to time, both of such agreement being amended and restated in the Development Agreement.

WHEREAS, the Parties desire to amend and restate the Original MEDA in order to provide certain planning, development and marketing services for the Project as more particularly outlined herein; and

WHEREAS, the City has determined that a legitimate public interest is served and that economic development is stimulated by entering into this Agreement for the continuing development and operation of the Land as a first class golf club, golf course and planned community (collectively, the "Project").

## AGREEMENT

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties hereby agree as follows:

## I.

## DEFINITIONS

As used herein, the following terms shall be defined as follows:
Section 1.01 Approved Master Drainage Plan. The term "Approved Master Drainage Plan" shall have the meaning defined in Section 4.05.

Section 1.02 Approved Master Plan. The term "Approved Master Plan" shall have the meaning described in Section 4.04.

Section 1.03 CC\&Rs. The term "CC\&R's" shall mean that certain Declaration of Covenants Condition and Restrictions for The Traditions dated February 26, 2004, and recorded in the Official Records of Brazos County, Texas, under Clerk's File No. 00847353, as amended, supplemented, and modified as of the date hereof.

Section 1.04 Central Property. The term Central Property shall mean the real property described on Exhibit B attached hereto.

Section 1.05 Club. The term "Club" shall mean Traditions Club located in Brazos County, Texas, which is constructed on and operated from the Golf Course Property.

Section 1.06 Club Development Fee. The term "Club Development Fee" shall mean a fee paid to Club Owner in an amount equal to Four Percent (4\%) of the gross sales price of each Lot sold to an Initial Purchaser to be applied toward (i) Club Owner's development, construction, and operational costs and expenses and (ii) if applicable, the initiation fee in the Club for each Lot, which fee is payable by the Partnership to Club Owner pursuant to the Development Agreement (as more particularly described therein).

Section 1.07 Club Owner. The term "Club Owner" shall mean the owner of the Club and the Golf Course Property, from time to time. TAP is the current Club Owner as of the date hereof.

Section 1.08 Clubhouse. The term "Clubhouse" shall have meaning ascribed to such term in the Development Agreement.

Section 1.09 Commercial Development. The term "Commercial Development" shall mean that portion of the Project shown on the Approved Master Plan as intended for retail, wholesale, restaurant, office, apartment, assisted living, nursing home or similar commercial uses.

Section 1.10 Development Unit. The term "Development Unit" shall mean a distinct portion of the Land which is contributed from time to time by BCDI to the Partnership for development by the Partnership. A Development Unit may be a portion or all of a phase as indicated on the phasing schedule of the Approved Master Plan.

Section 1.11 Force Majeure Event. The term "Force Majeure Event" shall mean any circumstances causing delay in the performance of any of the covenants and obligations of the Parties under the this Agreement due to any (i) strike(s), lockout(s) or labor dispute(s); (ii) inability to obtain labor or materials, or reasonable substitutes therefor; (iii) acts of God, governmental restrictions, regulations or controls, enemy or hostile governmental action, civil commotion, fire, or other casualty; (iv) litigation involving an action to enjoin performance or challenge the validity of this Agreement instituted by any person or entity not a party to this Agreement, or (v) other conditions similar to those enumerated in this Section that are beyond the reasonable control of the Party obligated to perform.

Section 1.12 Golf Course Property. The term "Golf Course Property" shall have the meaning ascribed to such term in the Development Agreement.

Section 1.13 Initial Lot. The term "Initial Lot" shall mean the Lot being conveyed back to the Partnership in a transaction pursuant to the Trade Program.

Section 1.14 Initial Purchaser(s). The term "Initial Purchaser(s)" shall mean the first purchaser of a Lot within the Planned Community.

Section 1.15 Land. The term "Land" shall mean the real property and rights appurtenant thereto identified on Exhibit A.

Section 1.16 Lot. The term "Lot" or "Lots" shall mean any residential or commercial lot, or unit, including time share or shared ownership unit of real property, within the Planned Community that is not a Parcel.

Section 1.17 Major Project Improvements. The term "Major Project Improvements" shall mean: all major arterial streets, including, without limitation, the loop road; all major utility infrastructure including, without limitation, electrical, gas, water, sewer, telephone cable, drainage structures, water and water delivery systems (including reclaimed water); the street lighting; landscaping of the medians and entryways; all signage for the Project including directional signage; traffic signals; and entryway structures and lighting including both on-site and off-site improvements necessary for the development of the Project.

Section 1.18 Neighborhood Subdivision Improvements. The term "Neighborhood Subdivision Improvements" shall mean, with respect to each Development Unit contributed to the Partnership, the non-arterial streets, drainage improvements, sidewalks and utilities, excluding Major Project Improvements and improvements for which the City shall pay within Parcel 35, as described in Section 2.07 below.

Section 1.19 Net Sale Proceeds. The term "Net Sale Proceeds" shall mean the gross sales price received by the Partnership for the sale of any of the Land, reduced by (i) the Club Development Fee, if applicable, and (ii) reasonable and customary costs of sale, including,
without limitation, the cost of title policies, surveys, tax prorations, escrow fees, broker commissions, and the like.

Section 1.20 Parcel. The term "Parcel" shall mean a parcel of land within the Planned Community sold by the Partnership to which the Partnership has not expended funds for the construction of Neighborhood Subdivision Improvements.

Section 1.21 Parcel Sales. The term "Parcel Sales" shall mean the sale of a Parcel.
Section 1.22 Partnership. The term "Partnership" shall mean Bryan/Traditions, LP, the Texas limited partnership formed by MCP, Rosemel Properties, Inc., and BCDI pursuant to the Original MEDA. TAP has purchased the interests in the Partnership formerly held by MCP and Rosemel Properties, Inc.

Section 1.23 Planned Community. The term "Planned Community" will mean all portions of the Project except for the Golf Course Property and the Central Property, including, without limitation, the Residential Community and the Commercial Development.

Section 1.24 Project. The term "Project" shall have the meaning given to such term in the Recitals.

Section 1.25 Residential Community. The term "Residential Community" shall mean that portion of the Property shown on the Approved Master Plan as intended for use as single family residential, duplex and/or condominium use.

Section 1.26 TIF. The term "TIF" shall mean Tax Reinvestment Zone Number 10 covering the Project and adopted by the City in accordance with Chapter 311, Texas Tax Code.

Section 1.27 Trade Consideration. The term "Trade Consideration" shall mean the difference between the amount paid for the Initial Lot (excluding any predevelopment discounts) and the purchase price of the Trade Lot.

Section 1.28 Trade Lot. The term "Trade Lot" shall mean the new Lot being conveyed by the Partnership in a transaction pursuant to the Trade Program.

Section 1.29 Trade Program. The term "Trade Program" shall mean a marketing program from the exchange of Lots as more fully described in Article VI of this Agreement.

## II.

## CITY AND BCDI OBLIGATIONS

Section 2.01 Local Government Corporation. The City may assign certain portions of this Agreement to BCDI and BCDI will assume and ratify this Agreement and comply herewith and the Partnership Agreement (defined below); provided, that no such assignment shall release the City from such obligations hereunder or thereunder. BCDI may perform such duties and responsibilities as it may assume with respect to operation and management of the TIF. BCDI will enforce and comply with the terms of the Development Agreement. BCDI will contribute

Development Units to the Partnership in accordance with the terms of this Agreement and the Partnership Agreement.

Section 2.02 TIF. The Parties hereby acknowledge receipt of the documentation regarding the TIF.

Section 2.03 Construction and Maintenance of Maior Project Improvements. Pursuant to the Original MEDA, the City was required to construct and pay for all Major Project Improvements required to develop the Project in accordance with the Approved Master Plan and the Approved Master Drainage Plan. The City and BCDI represent that they have constructed all such Major Project Improvements, except for two (2) bridges, multi-use paths and residential entry features to be located on Parcel 35, as defined below (the "Remaining MPI"). The City and BCDI agree to construct and pay for the Remaining MPI as such improvements are required in connection with the development of the Project. The City will also maintain (or cause to be maintained) all of the Major Project Improvements located on City or BCDI owned property or other property within the Project dedicated for public use; provided that the City owns such Major Project Improvements (e.g., the City would maintain water and sewer lines, but not gas lines owned by third parties).

Section 2.04 Negative Covenants. City agrees that it will not purchase or permit to be purchased on behalf of BCDI or similar entity controlled by the City additional land adjacent to the Land or which could be developed in competition with the Project without TAP's prior written consent. The City and BCDI agree that they will not fund a competing golf course development until such time as the Project is fully developed.

Section 2.05 Acquisition by TAP of Additional Land. The City and BCDI agree that TAP may acquire portions of the Project from the City, BCDI or the Partnership, as applicable, for its own account, subject to the restrictions set forth in the Partnership Agreement.

## Section 2.06 Partnership.

a. The City and TAP acknowledge that the Partnership was formed pursuant to the Original MEDA for the purpose of developing the Residential Community and the Commercial Development. Concurrently with the execution of this Agreement, the City and TAP shall enter into that certain Amended and Restated Agreement of Limited Partnership (the "Partnership Agreement") in order to reflect, among other things, the continuing obligations and covenants of BCDI and TAP hereunder. The City shall cause BCDI to comply with the terms of the Partnership Agreement.
b. The City shall cause BCDI to contribute the Land to the Partnership in Development Units, as required pursuant to the Partnership Agreement.

## Section 2.07 Parcel 35.

a. Reference is made to that certain 50.655 acre tract of land described on Exhibit C attached hereto and marked as "Parcel 35" on the Approved Master Plan ("Parcel 35"), which is subject to this Agreement and currently contemplated between the Parties to be developed as residential property. In order to assist in processing budget requests and obtaining
the appropriation of funds necessary for the City to perform it obligation under this Section 2.07, TAP will notify the City as soon as reasonably possible of its plans and timing for the development of Parcel 35. The City agrees that upon approval of a final plat of any portion of Parcel 35, the City shall perform the following:
i. The City and BCDI agree to grant to the Partnership a continuing access easement (the "Access Easement") over and across that certain tract of land labeled as "Access Easement" and a portion of Parcel 27 (the "Access Easement Land"), running from South Traditions Drive to Parcel 35 and adjacent to Parcels 29A and 34, all as depicted on the Approved Master Plan, for the purpose of public automobile, bicycle and pedestrian ingress and egress between South Traditions Drive and Parcel 35 or, in the alternative, dedicate the Access Easement Land as a public right-of-way for the purpose of such public access to Parcel 35.
ii. The City shall pay for two (2) new bridge structures over the creek crossings on the Access Easement at mutually agreed locations on the Access Easement allowing access to and development of Parcel 35. If an alternate route from South Traditions Drive to Parcel 35 is mutually agreed upon between the City and TAP requiring fewer bridge structures, the City will only build those bridge structures reasonably required by the new route.
iii. The City shall pay for multi-use paths in connection with any future residential development of Parcel 35.
iv. The Parties shall cooperate as necessary to obtain an amendment to the boundaries of the TIF to include Parcel 35 therein.
v. The City shall pay for residential entryway statements as may be reasonably necessary for residential development of Parcel 35.
b. Provided that TAP causes Substantial Completion (as defined in the Development Agreement) of the Clubhouse in accordance with the Development Agreement, TAP shall have the option for five (5) years following such Substantial Completion of the Clubhouse, to purchase Parcel 35 from BCDI, at the total price of $\$ 1.00$, by giving written notice thereof to the City and BCDI. Upon receipt of such notice, the City and BCDI agree to complete such conveyance upon such terms within ten (10) days following receipt of written notice of TAP's election thereof. Upon such conveyance, Parcel 35 shall no longer be subject to this Agreement without any further action by the Parties; provided, the Parties agree to enter into a confirmatory amendment to this Agreement reflecting the same upon request by any Party. Notwithstanding the foregoing, upon conveyance of Parcel 35 to TAP, the City shall participate in the construction of public infrastructure pursuant to the City's policy governing oversize participation, as said policy exists at the time of application for platting.

Section 2.08 Adjacent Property. The City shall cause BCDI to maintain a 100 -foot wide green space buffer in an "all natural" condition on Parcel 27, along the boundary between

Parcel 27 and Parcel 34, as depicted on the Approved Master Plan; provided, however, such buffer shall accommodate and not impede (i) the Access Easement and related improvements that the City is obligated to provide under Section 2.07 above, or the permitted use thereof by the Partnership and its successors and assigns, or (ii) the City from extending the current Club Drive across Parcel 27 to connect with Parcel 34.

Section 2.09 Clubhouse Construction Fees. The City agrees to waive the payment of all permit and development fees required for the construction of the Clubhouse.

Section 2.10 Access/Streets/Tunnel/Easement. The Parties acknowledge that the City has previously constructed or caused to be constructed all streets and other ingress/egress from existing public streets required for the operation of the Golf Property, including all roadways and easements to the Club (the "Club Roadways"). To the extent reasonably requested by TAP in the future, the City and BCDI agree to provide to TAP (or Club Owner, as applicable) irrevocable recorded ingress/egress easements (in addition to any previously granted) in a form reasonably acceptable to Club Owner for Club Owner, its guests, members, customers, contracts, employees, and invitees to have reasonably necessary ingress/egress to the Golf Course Property and any reasonably necessary drainage easements, irrigation line easements, cart path easements, and golf play easements (the "Street Facilities and Easements").

Section 2.11 Public Hotel Financing. The City shall provide non-financial cooperation to TAP and/or the Club Owner in obtaining public financing assistance, if any, for the development of a hotel/conference center on all or a portion of the Central Property. This section shall not obligate the City to provide any financing, funds or assets, nor shall it obligate Club Owner or TAP to develop a hotel/conference center on all or a portion of the Central Property.

Section 2.12 City of College Station Land. The Parties acknowledge that a portion of the Land is located within the city limits of College Station, Texas, and the City must obtain a Certificate of Convenience and Necessity (the "CCN") from the Texas Commission on Environmental Quality in order to provide water and wastewater services to such land. The City shall continue to use all reasonable efforts to obtain the CCN as soon as reasonably possible. Provided the City obtains the CCN, City agrees to construct or cause to be constructed, at its sole cost and expense, the necessary infrastructure to service the College Station Land, including a lift station with sufficient capacity to sever the wastewater lines provided by the City serving the College Station Land.

Section 2.13 Power Lines. The City agrees to use reasonable efforts to cause Bryan Texas Utilities to move the power lines running across Parcel 12, as depicted on the Approved Master Plan, as soon as is reasonably practicable so as to accommodate the development of such parcel by the Partnership.

## TAP'S OBLIGATIONS

Section 3.01 Development Services. TAP has certain obligations to contribute cash and other development services from time to time to the Partnership to develop the Land contributed to the Partnership by BCDI consistent with the phasing schedule of the Approved Master Plan and the Partnership Agreement, including the Neighborhood Subdivision Improvements for the Development Units within the Planned Community, but excluding all of the Major Project Improvements. The Partnership shall have no fixed take-down schedule. The number of Lots developed (if any) in a particular year shall be determined as market demand and economic cycles dictate. TAP shall have the right to cause the Partnership to obtain third-party financing in connection with installing the Neighborhood Subdivision Improvements or any other improvements in connection with developing a Development Unit, and to use such Development Unit to secure such financing; provided, however any financing obtained on behalf of the Partnership shall be negotiated at arm's-length and on terms generally consistent with comparable financing for similar projects in the State of Texas.

Section 3.02 Governance Framework. The City and TAP acknowledge that the CC\&R's have been created and recorded, and that TAP has caused to be created in connection therewith the owners associations and architectural control committees to ensure compliance with said CC\&R's.

## IV.

## REGULATIONS APPLYING TO DEVELOPMENT

Section 4.01 Subdivision Regulations and Public Improvement Specifications Applicable to Development. TAP and City agree that the Project will be developed in phases over an undetermined period of time and will involve numerous subdivisions requiring the platting of the Project in accordance with this Agreement. Furthermore, City acknowledges that the feasibility of the development of the Project is dependent on a predictable regulatory environment and stability in the design of subdivisions and the design and construction of public improvements related thereto. The City and TAP agree and confirm that the development of the Project will be best accomplished through this Agreement and will substantially advance the legitimate interest of the City in fostering economic development within the City. The City and its City Council further find that the execution of this Agreement is not inconsistent or in conflict with any existing City ordinances, codes and regulations.

Section 4.02 Zoning. The Parties acknowledge that the Land is zoned PD-M.
Section 4.03 Permitting. City will waive all permitting fees, subdivision fees, impact fees and similar charges relating to development in the Project which are required to be paid by TAP or the Partnership as the developer, but not fees which are chargeable to Lot purchasers.

Section 4.04 Approval of Master Plan. Attached hereto as Exhibit $E$ is the most recent version of the approved Master Land Use Plan applicable to the Planned Community agreed to
by the Parties under the Original MEDA (the "Approved Master Plan"). The Parties acknowledge and agree that portions of the Approved Master Plan are out of date or inaccurate due to changes from time to time in the Project. The City and TAP agree to work together diligently and in good faith to develop an updated Approved Master Plan as soon as reasonably practicable following the date hereof to the extent such changes are required by the Parties to accurately reflect the current plan for the development of the remainder of the Project. Upon the agreement between the City and TAP as to the Approved Master Plan, such plan shall be incorporated into this Agreement for all purposes. There shall be no amendments or modifications to the Approved Master Plan without the prior written consent of both the City and TAP.

Section 4.05 Master Drainage Plan. Attached hereto as Exhibit F is the most recent version of the approved master drainage plan applicable to Planned Community agreed to by the Parties under the Original MEDA (the "Approved Master Drainage Plan"). The Parties acknowledge and agree that portions of the Approved Master Drainage Plan may be out of date or inaccurate due to changes from time to time in the Project. The Parties agree to work together diligently and in good faith to develop an updated Approved Master Drainage Plan to the extent such changes are required by the Parties to accurately reflect the current plan for the continued development of the remainder of the Project. Upon the agreement between the City and TAP as to the Approved Master Drainage Plan, such plan shall be incorporated into this Agreement for all purposes. There shall be no amendments or modifications to the Approved Master Drainage Plan without the prior written consent of both the City and TAP.
V.

## EXTENSION OF CITY WATER AND WASTEWATER

Section 5.01 Easements for Utilities. BCDI agrees to dedicate to the City, such permanent utility easements on the Planned Community as are reasonably required for the construction, reconstruction, repair, replacement, maintenance and operation of Major Project Improvements, including without limitation, sites for any related sanitary sewer lift stations, to the extent that any of such easement were not previously granted under the Original MEDA. BCDI further agrees to provide such temporary construction easements and temporary materials storage sites as may be reasonably requested by the City, TAP, or the Partnership for use during construction of the Major Project Improvements or Neighborhood Subdivision Improvements.

Section 5.02 Design and Capacity of the City Improvements. TAP and City agree that:
a. City shall be obligated to provide at least the same level of water and wastewater service to the Project that is generally provided to City's other water and wastewater customers and at the same rates as provided such other customers or as is otherwise required by federal or state law or regulation; and,
b. In the event City authorizes the connection of water distribution or wastewater collection systems constructed in other subdivisions not located within the Project to water distribution or wastewater transmission mains serving subdivisions located within the

Project such that additional water supply capacity required by properties outside the Project or additional flows of wastewater originating from outside the Project accelerate the need to increase the capacity in said transmission mains in order to provide adequate capacity to serve subdivisions located within the Project, City will be responsible for providing the necessary upgrades.

## VI.

## TRADE PROGRAM

Section 6.01 Trade Program. The Partnership shall be free to offer owners of Lots the right to trade an Initial Lot for a Trade Lot of greater value in future phases of the Project. The Partnership shall accept an Initial Lot in trade for the Trade Lot and the payment of the Trade Consideration. Any sales commission and the development fees payable to TAP under the Partnership Agreement shall be based upon the Trade Consideration.

## VII.

## TERM/TERMINATION/SURVIVAL/DEFAULT

Section 7.01 Term of Agreement. This Agreement shall be in effect as to all provisions for a term sufficient to accommodate the development of the Project; in any event, however, not to exceed twenty (20) years from the date hereof. The term of this Agreement:
i. shall be subject to earlier termination as provided herein, or
ii. may be amended, extended, or terminated by mutual written agreement of the parties.

Section 7.02 Rights and Remedies. Failure by any Party to perform or otherwise act in accordance with any term or provision of this Agreement for a period of thirty (30) days for a default involving the payment of money or a period a sixty (60) days for a non-monetary default (the "Cure Period") after written notice thereof from the other Party, shall constitute a default under this Agreement; provided, however, that if the non-monetary default is such that more than sixty (60) days would reasonably be, required to perform such action of comply with any term or provision hereof, then such Party shall have such additional time as may be necessary to perform or comply so long as such Party commences performance or compliance within said 60 -day period and diligently proceeds to complete such performance or fulfill such obligation as soon as reasonably possible thereafter. Such notice shall specify the nature of the alleged default and the manner in which said default may be satisfactorily cured, if possible. In the event such default is not cured within the Cure Period, the non-defaulting party shall have all rights and remedies which may be available under law or equity, including without limitation the right to specifically enforce any term or provision hereof and/or the right to institute an action for damages or mandamus. Without limiting the foregoing, if the City (or as applicable BCDI) defaults under this Agreement, TAP may (i) terminate this Agreement and thereby be relieved and released of all obligations hereunder, or (ii) enforce this Agreement by seeking a writ of mandamus from a Brazos County District Court. In addition to the other remedies set forth herein, in the event of a
default by the City or BCDI, which is not cured within the time period specified herein, TAP may, at its option, cure such default. In such event, City and BCDI will pay to TAP the reasonable and necessary costs of such cure expended by TAP, together with, to the extent permitted by law interest thereon from the date of disbursement by TAP at the rate of twelve percent ( $12 \%$ ) per annum. Any amount not so paid within thirty (30) days of demand therefore may, in addition to other remedies available to TAP, be offset by TAP from any distributions otherwise due BCDI under the Partnership Agreement.

## VIII.

## ADDITIONAL PROVISIONS

Section 8.01 Amendments. This Agreement may be modified or amended only by the written agreement of the parties hereto. Notwithstanding anything herein, the consent of future owners of the Project (excluding TAP or any affiliate thereof) to amendments hereto shall be required only if such right is conferred to said owners in their respective vesting deeds.

Section 8.02 Entire Agreement. This Agreement contains the complete and entire agreement between the parties respecting the matters addressed herein, and supersedes all prior negotiations, agreements, representations, resolutions and understandings, if any, by and/or between the parties respecting such matters.

Section 8.03 Notices. Any notices or other communications required or permitted hereunder shall be sufficiently given if in writing and (i) hand delivered, including delivery by courier or overnight delivery service or, (ii) sent by facsimile, or (iii) sent by certified mail, return receipt requested, postage prepaid, addressed as shown below, or to such other address as the party concerned may substitute by written notice to the other. If the notice is sent by facsimile, it must be properly addressed, reflecting the facsimile phone number of the addressee(s), and must be transmitted by a facsimile which produces a dated message completed confirmation. All notices hand delivered shall be deemed received on the date of delivery. All notices forwarded by mail shall be deemed received on a date three (3) days (excluding Sundays and legal holidays when the U.S. mail is not delivered) immediately following date of deposit in the U.S. mail; provided, however, the return receipt indicating the date upon which all notices were received shall be prima facie evidence that such notices were received on the date on the return receipt.

If to TAP:
Traditions Acquisition Partnership, L.P. 1 Houston Center
1221 McKinney, Suite 3700
Houston, Texas 77010
Attn: Peter H. Currie
Phone: 713-209-1100
Fax: 713-209-1103

With a Copy to:
William Cole Clubs/Resorts
2611 FM 1960 West, Suite H-225
Houston, Texas 77068
Attn: Spencer Clements
Phone: 281-580-2085
Fax: 281-580-2095
With a Copy to:
Bracewell \& Giuliani LLP
711 Louisiana St., Suite 2300
Houston, Texas 77002
Attn: Clark G. Thompson, Jr.
Phone: 713-221-1414
Fax: 713-221-2116
If to City:
City of Bryan
P. O. Box 1000

Bryan, Texas 77805-1000
Attn: City Manager
Phone: 979-209-5119
Facsimile: 979-209-5119
If to BCDI :
Bryan Commerce and Development, Incorporated
P.O. Box 1000

Bryan, Texas 77805-1000
Attn: City Manager
Phone: 979-209-5106
Fax: 979-209-5106
Section 8.04 Savings and Severability. Any clause, sentence, provision, paragraph or article of this Agreement held by a court of competent jurisdiction to be invalid, illegal or ineffective shall not impair, invalidate or nullify the remainder of this Agreement, but the effect thereof shall be confined to the clause, sentence, provision, paragraph or article so held to be invalid, illegal or ineffective.

Section 8.05 Applicable Law. This Agreement shall be construed under and in accordance with the laws of the State of Texas and all obligations of the parties hereunder are deemed lo have been performed in Brazos County, Texas.

Section 8.06 Agreement Binding on Successors. This Agreement and all covenants, rights, benefits and privileges hereunder, shall be binding upon and shall inure to the benefit of
the parties hereto and their successors and permitted assigns. Neither party may assign this Agreement without the prior written consent of the other except as contemplated with respect to the City pursuant to Section 2.01 .

Section 8.07 Non-Waiver. Neither this Agreement nor any provisions hereof may be waived, modified, amended, discharged or terminated except by an instrument in writing signed by the party against which the enforcement of such waiver, modification, amendment, discharge or termination is sought, and then only to the extent set forth in such instrument.

Section 8.08 Warranty of Capacity. Each individual and entity executing this Agreement hereby represents and warrants that it has the capacity set forth on the signature pages hereof with full power and authority to bind the party on whose behalf he, she or it is executing this Agreement to the terms hereof.

Section 8.09 Time is of the Essence. Time is of the essence in the performance of and compliance with each of the provisions and conditions of this Agreement.

Section 8.10 Change of Address. Any party may change its address for notice by written notice given to the other in the manner provided herein.

Section 8.11 Execution of Multiple Counterparts. This Agreement may be executed in any number of counterparts, each of which shall be deemed an original, but all of which when taken together shall constitute one and the same instrument. The signature page of any counterpart may be detached therefrom without impairing the legal effect of the signature(s) thereon provided. Each signature page is attached to any other counterpart identical thereto except having additional signature pages executed by other parties to this Agreement attached thereto.

Section 8.12 Additional Instruments. The parties agree to execute such other instruments and to do such further acts as may be reasonably necessary to carry out the provisions of this Agreement.

Section 8.13 Memorandum of Agreement. The Parties agree to execute a memorandum of this Agreement in form of Exhibit D attached hereto and cause such memorandum to be recorded at the Office of the County Clerk in the Official Records of Brazos County, Texas.

Section 8.14 Parcels. All reference to numbered "Parcels" in this Agreement shall refer to the Parcels of land as numbered on the Approved Master Plan.

Section 8.15 Exhibits and Schedules. The following Exhibits and Schedules are attached hereto and incorporated herein:

## Exhibits

| A | Legal Description of Land |
| :--- | :--- |
| B | Central Property |
| C | Parcel 35 |

D Memorandum of Master Economic Development Agreement
E Approved Master Plan
F Approved Master Drainage Plan

EXECUTED to be effective for all purposes as of October 14, 2009
CITY OF BRYAN,


ATTEST:
len Astrdera
City Secretary

APPROVED AS TO FORM:
BRYAN COMMERCE AND DEVELOPMENT, INCORPORATED,
a Texas local gogerngnent corporation


Nam
D. MarkConlee

Its: President

## TRADITIONS ACQUISITION

PARTNERSHIP, L.P.
a Texas limited partnership
By: Traditions Acquisition Partnership GP, LLC, a Texas limited liability company, its General Partner

By:
Name: Peter H. Currie
Its: President

## EXHIBIT A

## LEGAL DESCRIPTION OF THE LAND

The legal description of the Land is set forth on the following eight (8) unnumbered pages.

## EXHIBIT A-1

Being all that certain 338,51 acre tract or parcel of land, lying and being situated in the J. H . Jomes Survey, Abstract No. 26, Zano phillipa Survay, Abatract No. 45, Brazos County, Texas, and being part of the 340 acre First Tract and all of the 10 acre Second Trace described in the deed from L. P. Gabbard and wife, Mildred H.Gabbard, to Richard Eruce Gabbard, Dexter T. Gabbard and James G. Gabbard, recorded in Volume 275, Page 81, of the Deed Records of Brazos County, Texas, and being more particularly described as follows:

BEGINNING at the $1 / 2^{\prime \prime}$ iron rod found at the Eence comer marking the east corner of the beforementioned 340 acre tract, same being the east comer of the 200 acre First Tract (Volume 104, Page 456);

THENCE along the average fence line found marking the southeast line of the beforementioned 340 acre tract as follows:

| $S$ | $45^{\circ}$ | $50^{\prime}$ | $17^{\prime \prime}$ | W |
| :--- | :--- | :--- | :--- | :--- |
| $S$ | $45^{\circ}$ | $58^{\prime}$ | $24^{\prime \prime}$ | $W$ |
| $S$ | $44^{\circ}$ | $18^{\prime}$ | $43^{\prime \prime}$ | $W$ |
| $S$ | $47^{\circ}$ | $37^{\prime}$ | $14^{\prime \prime}$ | W |
| $S$ | $44^{\circ}$ | $32^{\prime}$ | $35^{\prime \prime}$ | W |
| S | $47^{\circ}$ | $17^{\prime}$ | $41^{\prime \prime}$ | W |

1351.31 feet to a 1/2" iron rod,
478.74 feet to a $6^{\prime \prime}$ post found,
234.54 feet to a $16^{\prime \prime}$ post oak tree, 412.07 feet to a 9 " Red Oak tree,
694.61 feet to a $15^{\prime \prime}$ Blackjack tree,
700.08 feet to an 1 zon pipe found at the fence comer marking the south comer of the said 340 acre tract, same being the south corner of the 200 acre Second Tract (Volume 104, Page 456);

THENCE along the average fence line found marking the southwest line of the beforementioned 340 acre tract as follows:

N $44^{\circ} 25^{\prime} 57^{\prime \prime} \mathrm{W} 806.32$ feet to a $1 / 2^{\prime \prime}$ iron rod found marking the north corner of the B . J. Kling 25.10 acre tract,
N $43^{\circ} 45^{\prime} 27^{\prime \prime} \mathrm{W}$, at a distance of 1500.00 feet, pass a $1 / 2^{\prime \prime}$ iron rod set. continue on for a total distance of 3004.72 feet to a $1 / 2^{\text {n }}$ iron rod set at the west comer of the said 340 acre tract, same being the west corner of the 40 acre Third Tract (Volume 104, Page 456);

THENCB N 45" 56' $24^{\prime \prime} \mathrm{E}$ along the northwegt line of the beforementioned 340 acre tract, same being along or near the northwest line of the $J$. $H$. Jones Survey, $A-26$, for a distance of 2755.05 feet to a $1 / 2^{n}$ iron rod set in the southwest line of a 123.07 acre tract described in the deed from Richard Bruce Gabbard, et ali, to William G. Adkins, recorded in Volume 473, Page 128, of the Deed Records of Brazos County, Texas;

Tsgecs along the southwest and southeast lines of the beformentioned 123.07 acre tract as follows:


## EXHIBIT A-1

Page 1 of 2

## EXHIBIT A-1

HANCS along the southwest line of the beforementioned Hestwood Estates Subdivision a fellows:


THENCE $55^{\circ} 49^{\prime} 42^{\prime \prime} \mathrm{W}$ along the fence found marking the southeast line of the beforementioned 10 acre tract for a distance of 540.98 feet to an iron rod found marking the south corner of the said 10 acre tract;

THENCE $S 44^{\circ} 11^{\prime} 47^{\prime \prime} E$ along the fence found marking the northeast line of the beforementioned 340 acre tract for a distance of 857.12 feet to the PLACE OE BEGINNING, containing 338.51 acraz of land, more or less.

## SAVE E EXCBPT:

Being all that certain 40.00 acre tract or parcel of land, lying and being situated in the J. \#. Jones Survey, Abatract. No. 26, Zano Phillips Survey, Rbstract No. 45, Brazos County, Texas, and being part of the 340 acre First Tract and all of the 10 acre Second Tract described in the deed from L. P. Gabbard and wife, Mildred F. Gabbard, to Richard Bruce Gabbard, Dexter T. Gabbard and James G. Gabbard, recorded in Volume 275, Page 81, of he Deed Records of Brazos Councy, Texas, and being more particularly described as follows:

BEGTNNLNG at the iron rod found marking the south corner of the beforementioned 10 acre tract, said iron rod being or or mear the northeast line of the J. H. Jones Survey, A-26;

THENCE S $45^{\circ} 49^{\prime} 42^{\prime \prime}$ Wher a distance of 289.02 feet to a $2 / 2^{\prime \prime}$ iron rod set for corner;
THENCY N $64^{\circ} 30^{\circ} 22^{\prime \prime} \mathrm{W}$ for a distance of 2411.82 feet to a $1 / 2^{\prime \prime}$ iron rod set for cormer;

THENCE N $44^{\circ} 3^{\prime \prime} 48^{\prime \prime}$ W for a distance of 1369.37 Eeet to a $1 / 2^{\prime \prime}$ iron rod set for comer in the southeast line of a 123.07 acre tract described in the deed from Richard Bxuce Gabbard, et ali, to william G. Adkins, recorded in Volume 473, Page 128, of the Deed Records of Brazos County, Texas;

THBNCs $N 77^{\circ} 50^{\prime} 49 "^{\prime \prime} E$ along the southeast lime of the beforementioned 123.07 acre tract for a distance of 781.68 feet to a $1 / 2^{\prime \prime}$ iron rod found marking the most eagreriy gouth comer of the said 123.07 acre tract, sadd iron rod being in the southwest line of Lot 5 , Block A, Westwood Estates Subdivision, according to the plat recorded in Volume 342 , page 529, of the Deed Records of Brazos County, Texas;

THancz along the southwest IIne of the beforementioned Westwood Estates Subdivision as follows:


TERACS $S 5^{\circ} 49^{\prime} 42^{\prime \prime}{ }^{\prime \prime}$ along the sence found marking the southeast line of the beforementioned 10 acre tract for a distance of 540.98 feet to the pLace of bEGIMNING, containing 40.00 acren of land, more or less.

## EXHIBIT A-1

## EXHIBIT A-2

TRACT 1
Seing ail that certain tract or parcel of land, lying and being situatec in the J. F . JoNzs Langoz, h-26, in Brazos County, Texas, and being a part of that 501.31 aste tract of iand conveyed to h.s. Burgess by the Oakwood Realty Company, George B. Wilcox, Secretany, by deed cated March 14, 1946, and recorded in Volume 123, Fage 228, of she Deed Records of Brazos councy, Texas, and betng more parcicularly described as follows:

```
gzGINHLNG: at an iron rod at the most westerly corner of said 501.31 acre trace:
    THmNCS:N 44" 51' 51" E - 1685.73 feet to a fence corne= for comer;
    mmNCS: S 450 00' 00' E - 2388.45 feet to an iron rod for comer;
    TEINCE: N 440 03' 11" E - 2565.04 feet to an iron rod for comner; in the west right-of-way
    line of a County Road:
    THSNCE: S 280 20' 50' E - 413.53 feet along said County road line to a fence corner for
    cormer;
    THzNCz:. S 530 47' 55" W - 737.57 feet to a fence comer for comer:
    THENCE: S 330 06' 06" E - 1999.55 feet to a fence carner for corner;
    THENCE: S 45' 03' 32''W - 1632.60 feet to a fence corner for corner;
    THENCE: N 45' 44' 21" W ~ 207.45 feet to a fence comer for commer;
    THENCE: S 450 05' 32* W - 804.68 feet to a fence corner for comner;
```



```
    THZNCS: $44* 39'07" W - 622.00 feer to a fence corner for cormer;
    THENCE: N 45* 01' 04" W - 3635.40 feet to the PLACE OF EEGINNING and containing 242.04 acrea
    of land, more or less.
```


## SAVE E EXCEET:

Jeing all of that certain tract or parcel of land, lying and being situated in the J. f . Jonbs LEAGUE, Brazos County, Texas, and being a part of that 501.31 acre tract of land, conveyed to H.E. Burgess by the Oakwood Realty Company, George B. Wilcox, Secretary, by deed dated March 14, 1946, and recorded in Volume 123, Page 228, of the Deed Records of brazos County, Texas, and being more particularly described as follows:

COMGNCING: at an iron =od at the most northerly corner of said 502.32 acre tract;
MEENCE: N $44^{\circ} 51^{\prime \prime} 5 I^{\prime \prime} E-1266.78$ feet to a point for the place of bEginning;
THENCE: N $44^{\circ} 51^{\prime \prime} 51^{\prime \prime} E-416.95$ feet to a fence cortier for corner;
TERNCE: $S 45^{\circ} 00^{\prime} 00^{\prime \prime} E-2388.45$ feet to an iron rod for carner;
TEISNCE: S $44^{\circ} 03^{\prime} 11^{\prime \prime} \mathrm{W}-419.01$ feet to a point for corner;
THENCE: N $45^{\circ} 00^{\prime} 00^{\prime \prime} \mathrm{W}-2394.3 \mathrm{E}$ feet to the PLACE OF BEGINNING and containing 23.00 acras of land, more or less.

## TRACT 2:

Being all of that certain tract or parcel of land, lying and being situated in the J. H. Jomss tengot, A-26, Brazos County. Texas, and being a part of that 501.31 acre tract of land, conveyed to $\mathrm{H} . \mathrm{E}$, Burgess by the Oakwood Realty Company, George B. Wilcox, Secretary, by deed dated March 14, 1946, and recorded in Volume 123, Page 228, Deed Records of Brazos County, Texas, and being described as follows:

COMENCING at an iron rod at the most westerly corner of said 501.31 acre tract;
THINCE: $N 44^{\circ} 51^{\prime} 51$ E 2266.78 feet to a point for the pLACE OF EEGINNING;

THENCT: N 44' 51' 51" E 418.95 feet to a fence comer for corner;
THENCE: N $36^{\circ} 45^{\prime} 30^{\prime \prime} \mathrm{W} 601.64$ feet to a fence comer for comer;
THANCE: N 440 03' $11^{\prime \prime}$ E 2519.03 feet to a fence cormer for comer;
THance: $545^{\circ} 00^{\prime} 00^{\prime \prime} E 2947.84$ feet and $S 28^{\circ} 20^{\prime \prime} 50^{\prime \prime} \mathrm{E} 36.63$ feet to an iron rod for
corner;
TEENCE: S 440 03' $11^{\prime \prime} \mathrm{W} 2984.05$ feet to a point for comer;
TESNCE: N $45^{\circ} 00^{\prime} 00^{\prime \prime} \mathrm{H} 2334.38$ Eeet to the pLACE OF BEGINMING; and containing 200 acres of land, more or less.

## EXHIBIT A-3

Being all that certain tract or parcel of land lying and being aicuated in the Jobn G . Jones Laagua in Erazos County, Texas, and being more particularly described as follows, to-wit:

EgGINRIXG at a point in the northeasterly line of the Mrs. Lena Burger 306.97 acre tract this point being $N 45^{\circ} 35^{\prime} \mathrm{W} 805.3$ feet from an iron pipe marking the south comer of the Gabbard Tract the same being a common corner with the Burgess tract, this beginming point also being as common cormer with the Kary Jones James 76.74 acre tract;
resnce $N 45^{\circ} 35^{\prime} \mathrm{W}$ along the comon Ine between this tract and said Gabbard tract for a distance of 3.027 .9 feet and corner;
thance $S 4^{\circ} 28^{\prime}$ H for a distance of 1,472.2 feet and cornex;
HinNCB S $45^{\circ} 35^{\circ} \mathrm{E}$ along the common line between this tzact and the Gainez E . Jones 127.91 acre tract, hereinafter described, for a distance of $3,027.9$ feet and cormer in the northwest line of the Mary Jones James 76.74 acre tract;

THBNCS N $43^{\circ} 20^{\prime}$ E along the common line with said 76.74 acre tract for a distance of 1.472 .2 feet to the place of BEGINNING containing 102.32 wcres of land, more or less.

ALL THAT CERTADN TRACT OR PARCEL OF LAND lying and being situated in the John H. Jones Survey, A-26 in the City of Bryan, Brazos Counity, Texas, and being part of the 127.91acre Gainer B. Jones, Jr. trect recorded in Vohume 1242, Page 430 of the Official Public Records of Brazos County, Texas (O.P.R.B.C.), and being more particularly described as follows:

COMMENCING at a $1 / 2^{\prime \prime}$ iron rod found at the north comer of said Jones tract;
THENVCE along the northeast line of said Jones tract $S 47^{\circ} 54^{\prime} 55^{\prime \prime} \mathrm{E}, 324.22$ foet to a $1 / 2^{\prime \prime}$ iron rod set at the intersection of anid line with the east line of the $30^{\circ}$ Public Utility Easement granted to the City of Bryan in Volume 4381, Page 143 of the O.P.R.B.C. for the north comer of this tract and the PLACE OF BEGINNINO;

THENCE continuing along the northeast line of said Jones tract $S 47^{\circ} 54^{\prime} 55^{\prime \prime} E, 2067.76$ feet to a $1 / 2^{\prime \prime}$ iron rod set at the intersection of said line with the northwest line of another $30^{\prime}$ Public Utility Easerment granted to the City of Bryan in Volume 4381, Page 143 of the O.P.R.B.C. for the east cormer of this tract;

THENCE into said Jones tract along the northwest line of said Easement $\mathrm{S} 63^{\circ} 40^{\circ} 04^{\prime \prime} \mathrm{W}, 491.47$ feet to a I/2" iron rod set;

THENCE continuing along the northwest line of said Easement $\mathrm{S} 44^{\circ} 44^{\prime} 13^{\prime \prime} \mathrm{W}, 642.53$ feet 10 a $1 / 2^{n}$ iron rod set for the south comer of this easement;

THENCE along the north line of said Easement N $68^{\circ} 02^{\prime} 59^{\prime \prime} \mathrm{W}, 1312.39$ feet to a $1 / 2^{\prime \prime}$ iron rod set;

THENCE continuing along the north line of said Easement N $85^{\circ} 54^{\prime} 20^{\prime \prime} \mathrm{W}, 212.13$ feet to a $1 / 2^{\prime \prime}$ iron rod set for the west comer of this tract:

THENCE along the east line the first $30^{\prime}$ Public Utility Easement N $38^{\circ} 11^{\prime} 28^{\prime \prime}$ E, 847.73 feet to a $1 / 2^{n}$ iron rod set;

THENCE continuing along the east line of said Essement $N 16^{\circ} 28^{\prime} 55^{\prime \prime} \mathrm{E}, 926.36$ feet to the PLACE OF BEGNNNNG containing 50.6554 acres':

## EXHIBIT A-5


#### Abstract

Tract One: A 44.97 acre tract or parcel of land, lying and being situated in the T. J. WOOTEN SURVEY, ABSTRACT NO. 59, Bryan, Brazos County, Texas; and being more particularly described in a Warranty Deed from Nelleen Restmeyer to Bryan Commerce and Development Incorporated dated November 9, 2000, and recorded in Volume 3978, Page 137 of the Official Records of Brazos County, Texas.


## Tract Two:

A 26.76 acre tract or parcel of land lying and being situated in the T. J. Wooten Survey, Abstract No. 59, Bryan, Brazos County, Texas; and being more particularly described in a Warranty Deed from The Estate of John William Davros to Bryan Commerce and Development, Incorporated dated August 1, 2001, and recorded in Volume 4267, Page 316 of the Official Records of Brazos County, Texas.

## Tract Three:

A 28.40 acre tract or parcel of land lying and being situated in the T. J. Wooten Survey, Abstract No. 59, Bryan, Brazos County, Texas; and being more particularly described in a Warranty Deed from The Estate of John William Davros to Bryan Commerce and Development, Incorporated dated August 1, 2001, and recorded in Volume 4267, Page 320 of the Official Records of Brazos County, Texas.

Tract Four:
Tract 1 containing 25.01 acre tract or parcel of land, lying and being situated in the J. H. Jones Survey, Abstract No. 26, Brazos County, Texas; and Tracts 2 and 3 being all those certain tracts, parcels or strips of land lying and being situated in the John H. Jones League, Abstract No. 26, Brazos County, Texas; said three (3) tracts being more particularly described in a Warranty Deed from Billy J. Kling to Bryan Commerce and Development, Incorporated dated November 28, 2000, and recorded in Volume 3989. Page 201 of the Official Records of Brazos County, Texas.
(Collectively, Exhibit A-1, Exhibit A-2, Exhibit A-3, Exhibit A-4 and Exhibit A-5 are referred to as the "Parent Tract.")

## EXHIBIT A-5

SAVE AND EXCEPT and there is excepted from the Parent Tract the following parcels of land:

## Parcel One:

Tract One containing 16.581 acres, more or less, Tract Two containing 12.665 acres, more or less; and Tract Three containing 39.232 acres, more or less, all lying and being situated in the J. H. JONES SURVEY, A-26 and the THOMAS J. WOOTEN SURVEY, A-59, Brazos County, Texas, and being more particularly described in the Special Warranty Deed dated February 24, 2004, from Bryan Commerce and Development, Incorporated to Bryan/Traditions, LP recorded in Volume 5897, Page 277, Official Records of Brazos County, Texas.

## Parcel Two:

20.032 acre tract of land out of the J. H. Jones Survey, A-26, Bryan, Brazos County, Texas, and being more particularly described in the Special Warranty Deed dated June 25, 2004, from Bryan Commerce and Development, Incorporated to Bryan/Traditions, LP recorded in Volume 6174, Page 45, Official Records of Brazos County, Texas.

## Parcel Three:

6.34 acres, more or less, situated in the Thomas J. Wooten League, Abstract No. 59 and the J. H. Jones Survey, Abstract No. 26, Brazos County, Texas, and being more particularly described in the Special Warranty Deed dated September 27, 2004, from Bryan Commerce and Development, Incorporated to Bryan/Traditions, LP recorded in Volume 6336, Page 101, Official Records of Brazos County, Texas.

## Parcel Four:

27.80 acre tract or parcel of land, lying and being situated in the J. H. Jones Survey, Abstract No. 26, Bryan, Brazos County, Texas, and being more particularly described in the Special Warranty Deed dated February 25, 2005, from Bryan Commerce and Development, Incorporated to Bryan/Traditions, LP recorded in Volume 6587, Page 183, Official Records of Brazos County, Texas.

## Parcel Five:

Tract One - (Phase 9) containing 1.762 acres; Tract Two - (Phase 10) containing 9.913 acres; and Tract Three - (Phase 11) containing 18.803 acres, lying and being situated in the J. H. Jones Survey, Abstract No. 26 and the Thomas J. Wooten League, Abstract No. 59, Bryan, Brazos County, Texas, and being more particularly described in the Special Warranty Deed dated May 13, 2005, from Bryan Commerce and Development, Incorporated to Bryan/Traditions, LP recorded in Volume 6668, Page 210, Official Records of Brazos County, Texas.

## Parcel Six:

Phase 12-5.86 acre tract; Phase 13-10.948 acre tract; and Phase 14-28.342 acres, lying and being situated in the J. H. Jones Survey, Abstract No. 26, Bryan,

Brazos County, Texas, and being more particularly described in the Special Warranty Deed dated January 26, 2006, from Bryan Commerce and Development, Incorporated to Bryan/Traditions, LP recorded in Volume 7125, Page 182, Official Records of Brazos County, Texas.

## Parcel Seven:

19.82 acre tract, more or less, situated in the Thomas J. Wooten League, A-59 and the J. H. Jones Survey, A-26, Brazos County, Texas, and being more particularly described in the Special Warranty Deed dated August 10, 2006, from Bryan Commerce and Development, Incorporated to Bryan/Traditions, LP recorded in Volume 7514, Page 153, Official Records of Brazos County, Texas.

## Parcel Eight:

19.62 acre tract, more or less, situated in the Thomas J. Wooten League, A-59 and the J. H. Jones Survey, A-26, Brazos County, Texas, and being more particularly described in the Special Warranty Deed dated December 14, 2007, from Bryan Commerce and Development, Incorporated to Bryan/Traditions, LP recorded in Volume 8377, Page 180, Official Records of Brazos County, Texas.

## Parcel Nine:

1.65 acre tract, more or less, situated in the J. H. Jones Survey, A-26, Brazos County, Texas, and being more particularly described in the Special Warranty Deed dated October 21, 2008, from Bryan Commerce and Development, Incorporated to Bryan/Traditions, LP recorded in Volume 8843, Page 279, Official Records of Brazos County, Texas.

## Parcel Ten:

Any portion of the Parent Tract lying in the property described in a deed from Bryan Commerce and Development, Incorporated to Traditions Club by Melrose, LLC and recorded in Volume 5153, Page 1 of the Official Records of Brazos County, Texas.

## Parcel Eleven:

Any portion of the Parent Tract lying in the property described in a Gift Deed from Bryan Commerce and Development, Incorporated to the Board of Regents of Texas A\&M University System and recorded in Volume 7988, Page 209, of the Official Records of Brazos County, Texas.

## Parcel Twelve:

Any portion of the Parent Tract lying in the property described in a Gift Deed from Bryan Commerce and Development, Incorporated to the City of Bryan recorded in Volume 8332, Page 207 of the Official Records of Brazos County, Texas.

## EXHIBIT B

## CENTRAL PROPERTY

The Central Property is depicted on the Approved Master Plan as Parcels 1 and 2, and is legally described as follows:

Lot 2 and Lot 3, Block 1, of Traditions Subdivision Pahse 16, according to the Replat thereof filed under Vol. 8094, Pg. 81, in the Official Records of the County Clerk of Brazos County, Texas.

## EXHIBIT C

PARCEL 35
(See Attached)
Parcel 35 is legally described as follows:

ALL THAT CERTAIN TRACT OR PARCEL OF LAND lying and being situated in the John H . Jones Survey, A-26 in the City of Bryay, Brazos County, Texas, and being part of the 127.91aere Gainer B. Jones, Ir. tract reconded in Volume 1242, Page 430 of the Official Public Records of Brazos Cownty, Texas (O.P.R.B.C.), and being more particularly described as follows:

COMMENCING at a $1 / 2^{\text {m }}$ iron rod found at the north corner of said Jones tract;
THENCE along the nortizeast line of sald Jowes tract $S 47^{\circ} 54^{\circ} 55^{\prime \prime}$ E, 324.22 foet to a $1 / 2^{\prime \prime}$ iron rod set at the intersection of said line with the east line of the $30^{\prime}$ Public Uuility Eusement granted to the City of Brym in Volume 4381, Page 143 of the O.P.R.B.C. for the north comer of this tract and the PLACE OF BEGINNDNG;

THENCE contiming tiong the northease line of said Jones tract $S 47^{\circ} 54^{\prime} 55^{\circ} \mathrm{E}, 2067.76$ feet to a $1 / 2^{\prime \prime}$ iron rod set at the intersection of said line with the northwest line of another $30^{\prime}$ Public Utility Ensement granted to the City of Bryan in Volume 4381, Page 143 of the O.P.R.B.C. for the east corner of this trect;

THENCE into said Jones tract elong the northwest line of said Eesement $\mathrm{S} 63^{\circ} 40^{\circ} 04^{\prime \prime}$ W, 491.47 feet to $31 / 2^{\prime \prime}$ iron rod set;

THENCE continuing along the northwest line of saia Eascment $S 44^{\circ} 44^{\prime} 13^{\prime \prime}$ W, G22.53 feet 0 a $1 / 2^{2}$ iron rod set for the south comer of this ceasement;

THENCE along the north line of sadd Easement $\mathrm{NF}^{\circ} 68^{\circ} 02^{\prime} 59^{\prime \prime}$ W, 1312.39 feet to a $1.22^{\prime}$ irou roci set:

THENCE condinuing along the north line of said Easernent Ni $85^{\circ} 54^{\prime} 20^{\prime \prime} \mathrm{W}, 212.13$ feet to a $1 / 2^{\prime \prime}$ iron rod set for the west corner of this tract;

THENCE along the east line the first $30^{\prime}$ Public Utility Easement $\mathrm{N}^{\prime} 38^{\circ} 111^{\prime} 28^{\circ \prime} \mathrm{E}, 847.73$ feet to a $1 / 2^{n}$ iron rod seti

THENCE Continuing along the emst line of said Exsement ${ }^{\left(1628^{\prime} 55^{\prime \prime}\right.}$ E, 926.36 teet to the PLACE OF BEGRNNING containing 50.6554 acres.

## EXHIBIT D

## MEMORANDUM OF MASTER DEVELOPMENT AGREEMENT

MEMORANDUM OF AMENDED AND RESTATED MASTER ECONOMIC DEVELOPMENT AGREEMENT

## STATE OF TEXAS )

 COUNTY OF BRAZOS )THIS MEMORANDUM OF AMENDED AND RESTATED MASTER ECONOMIC DEVELOPMENT AGREEMENT (this "Memorandum") is entered into by and among TRADITIONS ACQUISITION PARTNERSHIP, L.P., a Texas limited partnership ("TAP") (successor in interest to Melrose Community Properties, L.P.), BRYAN COMMERCE AND DEVELOPMENT, INC., a Texas local government corporation ("BCDI"), and CITY OF BRYAN, a Texas home rule city (all of the foregoing parties to this Agreement shall be collectively referred to herein as the "Parties", and sometimes individually referred to as a "Party"),

WHEREAS, The City and Melrose Community Properties, L.P. (f/k/a Jordan Community Properties, L.P.), a Texas limited partnership ("쓸"), entered into that certain Master Economic Development Agreement dated November 2, 1999, as amended, supplemented and modified as of the date hereof (the "Original MEDA"), and TAP has acquired all of the interests of MCP in and to the Original MEDA.

WHEREAS, The Parties are executing this Memorandum in order to evidence their execution of that certain Amended and Restated Master Economic Development Agreement dated effective $\qquad$ , 2009 (the "Agreement"), pursuant to which the Parties have amended and restated the Original MEDA in its entirety, and made certain agreements regarding the real property located in Bryan, Brazos County, Texas, and more particularly described on Exhibit A, attached hereto and incorporated herein by reference (collectively, the "Land").

NOW, THEREFORE, the Parties have caused this Memorandum to be placed of record for the purpose of putting third parties on notice of the existence of the Agreement. The Agreement provides for certain rights and obligations of the Parties, including without limitation rights and obligations relating to covenants of the City and BCDI to contribute portions of the Land, from time to time, to Bryan/Traditions, LP, a Texas limited partnership (the "Partnership"), which is a partnership formed between TAP and BCDI for the purpose, among other things, of performing obligations contemplated in the Agreement. The Agreement, among other things, creates certain restrictions and covenants running with the Land and are intended to be binding upon the respective successors and assigns of City, BCDI, and TAP. The Land shall be sold to any third party other than the Partnership subject to the terms of the Agreement.

The purpose of this Memorandum is solely to notify all third parties dealing with the Land of the need to examine a copy of the Agreement, as it may be amended from time to time, prior to effectuating any transaction which would pertain to the Land or any interest therein.

Upon the recording of a deed conveying any portion of the Land from BCDI to the Partnership, the recording of such deed shall act as a release of the portion of the Land described therein from encumbrance by this Memorandum without any further action on the part of the Parties.

This Memorandum amends and restates and supersedes that certain Memorandum of Master Economic Development Agreement dated March 2, 1999, and recorded at Volume 4152, Page 1 of the Official Records of Brazos County, Texas. This Memorandum in no way modifies or amends the terms and provisions of the Agreement. In the event of any irreconcilable conflict between this Memorandum and the Agreement, the Agreement shall govern and control. This Memorandum may be executed in multiple counterparts that together constitute a single document.
[Signature Page Follows]

IN WITNESS WHEREOF, this Memorandum of Lease has been executed on the date(s) set forth in the acknowledgments, to be effective as of 2009.

TAP:
TRADITIONS ACQUISITION PARTNERSHIP, L.P., a Texas limited partnership

By: Traditions Acquisition Partnership GP, LLC, a Texas limited liability company, its General Partner


Name: Peter H. Currie
Title: President

## BCDI:

BRYAN COMMERCE AND DEVELOPMENT, INCORPORATED,
a Texas local government corporation
By:
Name: $\qquad$
Title: $\qquad$

CITY:
CITY OF BRYAN, a Texas home rule city

By:
Name: $\qquad$
Title: $\qquad$

## COUNTY OF HARRIS

Notary Public in and for the State of Texas
Printed Name: Damille N. W ynne
My Commission Expires: Ahgi 19,2012

## STATE OF TEXAS ' <br> COUNTY OF HARRIS

This instrument was acknowledged before me on $\qquad$ , 2009, by of Bryan Commerce and Development Incorporated, a Texas local government corporation, on behalf of said local government corporation.

Notary Public in and for the State of Texas
Printed Name:
My Commission Expires:

This instrument was acknowledged before me on $\qquad$ 2009, by

##  <br> STATE OF TEXAS ' <br> COUNTY OF BRYAN '

 rule city, on behalf of said home rule city. of City of Bryan, a Texas homeNotary Public in and for the State of Texas
Printed Name: $\qquad$
My Commission Expires: $\qquad$

## EXHIBIT A

## Description of the Land

[To be inserted upon execution]

EXHIBIT E

## APPROVED MASTER PLAN

(See attached)


## EXHIBIT F

## APPROVED MASTER DRAINAGE PLAN

(See attached)

# City of Bryan 

## Traditions Golf Course Storm Water Master Plan

June 20, 2001

Prepared For:
The City of Bryan 300 South Texas Avenue Austin, Texas 77803

Prepared By:
Camp Dresser \& McKee Inc.
9111 Jollyville Road
Suite 105
Austin, TX 78759


## Table of Contents

Section 1 Purpose and Introduction ..... 1-1
Section 2 Data Compilation and Review ..... 2-1
2.1 Project Map ..... 2-1
2.2 Drawing Files ..... 2-1
2.3 Other Data ..... 2-1
Section 3 Subcatchment Delineation and Model Schematic ..... 3-1
Section 4 Land Use ..... 4-1
Section 5 Hydrologic Model Parameters ..... 5-1
Section 6 Hydraulic Model Development ..... 6-1
Section 7 Model Results ..... 7-1
Section 8 Summary of Recommendations ..... 8-1
Tables
Table 1 Summary of Pre-Development Land Use ..... 4-2
Table 2 Summary of Post-Development Land Use ..... 4-3
Table 3 Comparison of HEC-2 and SWMM ..... 5-1
Table 4 Pre-Development Hydrologic Model (RUNOFF) Parameters ..... 5-1
Table 5 Post-Development Hydrologic Model (RUNOFF) Parameters ..... 5-4
Table 6 Design Parameters for New Culverts ..... 6-2
Table 7 Summary of Peak Water Surface Elevations ..... 7-2
Table 8 Summary of Peak Flow Rates ..... 7-4
Figures
Figure 1 Turkey Creek Watershed and Traditions Project Area ..... 1-2
Figure 2 Model Subcatchments and Schematic ..... 3-2
Figure 3 Model Subcatchments and Schematic in Project Area ..... 3-3
Figure 4 Culvert Numbers and Locations ..... 6-3

## Section 1

## Purpose and Introduction

The purpose of this Storm Water Master Plan is to model the Traditions development area under the proposed development conditions in order to conceptually design detention facilities and determine the overall impact on BFEs within the development. The detention facilities will be designed to allow the 25 -year peak flows from the development to be no greater under developed conditions than under existing conditions. The 25 - and 100 -year design storms being used currently within other Flood Hazard Studies within the City will be used for this Storm Water Master Plan. The RUNOFF block of the Storm Water Management Model (SWMM) will be used for hydrologic simulations, and the EXTRAN block of SWMM will be used for hydraulic simulations.

The Traditions project area comprises approximately 710 acres within the Turkey Creek watershed and another 234 acres outside of the Turkey Creek watershed, as shown in Figure 1. This study focuses primarily on the area within the Turkey Creek watershed since development within this area is scheduled to occur first. Development outside of the watershed is planned for a future phase. To accurately assess the impacts of the Traditions development on Turkey Creek and its major tributaries, all but the most downstream portion of the watershed was included in this study, with the level of detail being higher within the project area.

## Section 2 <br> Data Compilation and Review

The data required to perform this study were provided in the form of a project map, drawing files, previous studies/files, and correspondence with the City of Bryan. Following is a summary of the data compiled for this study

### 2.1 Project Map

The project map was provided in hard copy form. The map, which was produced at a scale of 1 inch $=200$ feet, contained digital 2 -ft contours from the recent aerial photogrammetry, existing roads, the major roads planned within the development, other existing planimetric data. Hand drafting on the map consisted of preliminary lot lines and other major development areas within the Traditions project area.

### 2.2 Drawing Files

A drawing file of the project area was also provided by CSC. As mentioned above, the drawing file contained the 2 - ft contours within and around the project area and roads planned within the project area. The drawing file also contained a preliminary layout of the golf course, wetland areas, the project boundary, and stream centerlines.

### 2.3 Other Data

HEC-1 and HEC-2 files were provided for the project area by CSC. Additionally, an HEC-2 file for Turkey Creek was provided by the City. The HEC-1 file was used to corroborate infiltration values used in the rainfall-runoff model for this study. The HEC-2 file for Turkey Creek was used to develop that portion of the hydraulic model. The HEC- 2 model of the project area was not used for this study because differences between the input files and the $2-\mathrm{ft}$ contours were unable to be reconciled. Instead, new sections within the project area were cut from the $2-\mathrm{ft}$ contours for the hydraulic model for this study. At the time of this writing, hydraulic data on the two major crossings of Turkey Creek near the project area had not yet been received.

Rainfall data were supplied by the City via email correspondence. The rainfall distribution used for this study is the same as that used for the City's other Flood Hazard Studies.

Aerial photographs of the Turkey Creek Watershed were purchased from Texas Natural Resources Information System (TNRIS). The TNRIS photos were taken in 1998 and were used to determine existing or pre-development land use conditions within the watershed. Post-development conditions were formulated by superseding these conditions with the planned development within the project area. Land use summaries are presented in Section 4.

## Section 3

## Subcatchment Delineation and Model Schematic

As mentioned previously, most of the Turkey Creek Watershed was included in this study in order to accurately quantify the impacts of the Traditions development. Since a more detailed representation was required within the project area, the level of subcatchment discretization is much finer in this area than within the rest of the watershed. Subcatchment boundaries were based on the $2-\mathrm{ft}$ contour data where available, and on the 10 - ft contours from the USGS quad sheets for the remainder of the area, resulting in a total of 47 subcatchments varying in size from 4.9 to 886 acres. The hydraulic model consists of 100 conduits, most of which are irregularly shaped open channels. Figures 2 and 3 show the subcatchment delineation and hydraulic model schematic. Figure 2 provides the entire watershed area, and Figure 3 provides more detail within the project area. Note that the node labels shown in Figures 2 and 3 also represent the name of the downstream conduit (i.e., the conduit name and the upstream node name are the same). The naming convention used for nodes/conduits is an alpha identifier representing the tributary name (i.e., the TCS in node/conduit TCS34615 represents the Turkey Creek mainstem) following by a numeric identifier representing the distance in feet from the mouth along the centerline of the stream (i.e., the 34615 in TCS34615 means that it is 34,615 feet upstream of the Brazos River along the Turkey Creek mainstem centerline).

## Section 4 <br> Land Use

In order to quantify the impacts of the Traditions development, it was necessary to establish pre- and post-development land use. Pre-development land use was determined from 1998 aerial photographs of the watershed. Land uses were grouped into seven categories based on directly connected impervious area (DCIA) and include the following:

- Forest, open, agriculture, and golf course (1\% DCIA)
- Rural residential (7.5\% DCIA)
- Medium density residential (30\% DCIA)
- High density residential ( $45 \%$ DCIA)
- Commercial (75\% DCIA)
- Major roads ( $90 \%$ DCIA)
- Water ( $100 \%$ DCIA)

Pre-development land use for the 47 subcatchments is summarized in Table 1. Postdevelopment land use is summarized in Table 2.



## Section 5

## Hydrologic Model Parameters

In addition to determining land uses for each of the subcatchments, it was also necessary to characterize subcatchment slope and shape. This characterization was completed by sampling up to three characteristic flow paths per subcatchment and performing an area-weighted average. The resulting area-weighted overland slope is input directly into the model, and the resulting area-weighted length is divided into the subcatchment area to determine the subcatchment width term that is entered into the model. Once land uses and flow paths were determined, the infiltration characteristics of the soils were characterized. Initial estimates for Horton infiltration parameters were taken from areas with similar soil characteristics. The model was then run and compared to HEC-1 results from the CSC model and flow values in the Turkey Creek HEC-2 model for the 100-year storm event. Runoff volumes compared very favorably to runoff volumes from the CSC HEC-1 model. A comparison of peak flow rates to those from the HEC-2 model of Turkey Creek is shown in Table 3. In the upper portions of the watershed where development has not changed significantly from the time that flows in the HEC- 2 model were developed, the peak flow values from the two models are very similar. Further downstream in the watershed, the predevelopment model from this study predicts slightly large peak flow rates, which is a reasonable reflection of the development that has occurred in the watershed since the time that the HEC-2 model was developed. Based on the reasonable comparisons to these two models, no further adjustments were warranted. Final hydrologic model values for pre- and post-development conditions are summarized by subcatchment in Tables 4 and 5, respectively.

| Table 3 |  |  |  |
| :---: | :---: | :---: | :---: |
| Comparison of HEC-2 and SWMM <br> 100-year Pre-development Flows    <br> HEC-2 SWMM HEC-2  <br> Section Model SWMM  <br> Number ID (cfs) Flow <br> (cfs) |  |  |  |
| 1.51 | TCS8150 | 6200 | 6940 |
| 3.27 | TCS18495 | 4500 | 5380 |
| 4.39 | TCS22605 | 3900 | 3900 |
| 5.27 | TCS30205 | 1850 | 1770 |
| 6.86 | TCS34615 | 1000 | 1120 |



| Table 4 <br> Pre-development Hydrologic Model (RUNOFF) Parameters |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{gathered} \text { Subcatch- } \\ \text { ment } \\ \text { ID } \\ \hline \hline \end{gathered}$ | Load <br> Point | $\begin{gathered} \text { Width } \\ (\mathrm{ft}) \\ \hline \hline \end{gathered}$ | Area(ac) | $\begin{gathered} \text { DCIA } \\ \% \\ \hline \end{gathered}$ | Slope $\mathrm{ft} / \mathrm{ft}$ | Overland <br> Roughness |  | Depression Storage |  | Horton Infiltration Parameters |  |  |
|  |  |  |  |  |  |  |  | Imp. | Perv. | Max. | Min. | Decay Rate |
|  |  |  |  |  |  | Imp. | Perv. | (in.) | (in.) | in/ hr | $\mathrm{in} / \mathrm{hr}$ | $1 / \mathrm{sec}$ |
| 10 | ES4735 | 4069 | 67.1 | 4.3 | . 0557 | . 015 | . 349 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 15 | ES1570 | 2764 | 56.7 | 18.7 | . 0495 | . 021 | . 344 | . 13 | . 20 | 4.00 | 0.15 | 0.000833 |
| 20 | TCS34615 | 4766 | 440.2 | 18.9 | . 0168 | . 015 | . 327 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 30 | TCS16150 | 2203 | 55.8 | 5.0 | . 0489 | . 084 | . 350 | . 42 | . 20 | 4.00 | 0.15 | 0.000833 |
| 40 | TCS14660 | 1467 | 38.9 | 5.7 | . 0340 | . 067 | . 350 | . 35 | . 20 | 4.00 | 0.15 | 0.000833 |
| 42 | TCS27735 | 3031 | 210.9 | 15.0 | . 0273 | . 021 | . 314 | . 13 | . 20 | 4.00 | 0.15 | 0.000833 |
| 45 | TCS12825 | 3568 | 187.2 | 40.7 | . 0267 | . 019 | . 336 | . 12 | . 20 | 4.00 | 0.15 | 0.000833 |
| 47 | DS4275 | 3251 | 79.2 | 30.0 | . 0499 | . 015 | . 250 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 50 | E3S550 | 1107 | 24.3 | 1.0 | . 0408 | . 015 | . 350 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 52 | D151450 | 3712 | 107.3 | 21.1 | . 0221 | . 015 | . 302 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 55 | BS2120 | 2408 | 74.4 | 12.0 | . 0337 | . 017 | . 342 | . 11 | . 20 | 4.00 | 0.15 | 0.000833 |
| 57 | GS7635 | 3620 | 430.8 | 5.7 | . 0155 | . 016 | . 343 | . 11 | . 20 | 4.00 | 0.15 | 0.000833 |
| 60 | E1S1420 | 3446 | 58.3 | 1.1 | . 0768 | . 015 | . 350 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 62 | GS6651 | 3350 | 118.3 | 1.8 | . 0291 | . 034 | . 342 | . 19 | . 20 | 4.00 | 0.15 | 0.000833 |
| 63 | CS770 | 861 | 32.8 | 10.8 | . 0241 | . 045 | . 344 | . 24 | . 20 | 4.00 | 0.15 | 0.000833 |
| 65 | E1S2610 | 2915 | 116.5 | 13.0 | . 0322 | . 018 | . 344 | . 11 | . 20 | 4.00 | 0.15 | 0.000833 |
| 70 | TCS11415 | 3808 | 316.3 | 13.6 | . 0193 | . 027 | . 329 | . 16 | . 20 | 4.00 | 0.15 | 0.000833 |
| 72 | GS5255 | 1805 | 46.0 | 20.8 | . 0383 | . 025 | . 346 | . 15 | . 20 | 4.00 | 0.15 | 0.000833 |
| 75 | DS5785 | 7570 | 886.1 | 15.0 | . 0171 | . 016 | . 324 | . 11 | . 20 | 4.00 | 0.15 | 0.000833 |
| 80 | ES3890 | 1851 | 25.7 | 1.0 | . 0585 | . 015 | . 350 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 82 | TCS18495 | 3565 | 86.7 | 5.0 | . 0526 | . 083 | . 350 | . 42 | . 20 | 4.00 | 0.15 | 0.000833 |
| 85 | TCS33080 | 1955 | 55.2 | 7.5 | . 0368 | . 015 | . 347 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 90 | TCS32205 | 2433 | 140.3 | 4.4 | . 0299 | . 015 | . 341 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 95 | TCS30205 | 2891 | 222.7 | 5.3 | . 0225 | . 015 | . 335 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |


| Table 4 (Continued) <br> Pre-development Hydrologic Model (RUNOFF) Parameters |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Subcatch- | Load <br> Point | Width <br> (ft) |  | $\begin{gathered} \text { DCIA } \\ \% \\ \hline \end{gathered}$ | Slope $\mathrm{ft} / \mathrm{ft}$ | Overland <br> Roughness |  | DepressionStorage |  | Horton Infiltration Parameters |  |  |
| ment |  |  | Area$(\mathrm{ac})$ |  |  |  |  | Imp. | Perv. | Max. | Min. | Decay Rate |
| ID |  |  |  |  |  | Imp. | Perv. | (in.) | (in.) | $\mathrm{in} / \mathrm{hr}$ | in/hr |  |
| 101 | A2AS1180 | 2259 | 94.1 | 5.1 | . 0318 | . 084 | . 350 | . 42 | . 20 | 4.00 | 0.15 | 0.000833 |
| 102 | A2AS510 | 824 | 10.7 | 1.0 | . 0547 | . 015 | . 350 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 104 | A2S1940 | 1830 | 30.6 | 1.7 | . 0504 | . 052 | . 350 | . 27 | . 20 | 4.00 | 0.15 | 0.000833 |
| 105 | A2BS810 | 857 | 14.5 | 2.1 | . 0447 | . 015 | . 347 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 106 | A2BS310 | 405 | 4.9 | 2.0 | . 0287 | . 058 | . 350 | . 30 | . 20 | 4.00 | 0.15 | 0.000833 |
| 107 | A2S550 | 1171 | 22.7 | 1.2 | . 0606 | . 015 | . 345 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 109 | AS2640 | 2325 | 48.0 | 1.1 | . 0680 | . 015 | . 347 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 110 | A1S1370 | 1706 | 51.6 | 7.6 | . 0468 | . 029 | . 334 | . 17 | . 20 | 4.00 | 0.15 | 0.000833 |
| 201 | FS1235 | 1461 | 13.6 | 26.1 | . 0457 | . 071 | . 349 | . 37 | . 20 | 4.00 | 0.15 | 0.000833 |
| 202 | FS825 | 522 | 7.1 | 1.0 | . 0575 | . 015 | . 350 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 301 | E2S340 | 579 | 9.0 | 9.8 | . 0416 | . 015 | . 347 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 302 | ES6140 | 1117 | 18.4 | 5.2 | . 0567 | . 015 | . 348 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 771 | TCS23915 | 5136 | 193.3 | 16.7 | . 0381 | . 023 | . 324 | . 14 | . 20 | 4.00 | 0.15 | 0.000833 |
| 772 | TCS20745 | 2156 | 81.2 | 3.5 | . 0402 | . 077 | . 350 | . 39 | . 20 | 4.00 | 0.15 | 0.000833 |
| 773 | GS1655 | 3080 | 210.4 | 11.5 | . 0282 | . 027 | . 345 | . 16 | . 20 | 4.00 | 0.15 | 0.000833 |
| 1031 | A2S3440 | 1600 | 26.4 | 14.6 | . 0472 | . 015 | . 345 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 1032 | A2CS745 | 1878 | 47.7 | 3.4 | . 0431 | . 015 | . 350 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 1081 | A5S460 | 722 | 14.2 | 1.0 | . 0558 | . 015 | . 350 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 1082 | A4S260 | 643 | 12.6 | 1.5 | . 0539 | . 015 | . 339 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 1083 | A3S450 | 1818 | 30.6 | 3.0 | . 0551 | . 072 | . 350 | . 37 | . 20 | 4.00 | 0.15 | 0.000833 |
| 1084 | AS6670 | 1507 | 37.9 | 6.3 | . 0408 | . 081 | . 343 | . 41 | . 20 | 4.00 | 0.15 | 0.000833 |
| 1086 | AS4390 | 1692 | 22.7 | 1.0 | . 0786 | . 015 | . 350 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 1087 | AS5720 | 1105 | 18.5 | 1.0 | . 0621 | . 015 | . 350 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |


| Table 5Post-development Hydrologic Mod |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Subcatch- | Load <br> Point | Width <br> (ft) | Axea(ac) | $\begin{gathered} \text { DCIA } \\ \% \\ \hline \end{gathered}$ | Slope fyft | Overland <br> Roughness |  | Depression Storage |  | Horton Infiltration <br> Parameters |  |  |
| ment |  |  |  |  |  |  |  | Imp. | Perv. | Max. | Min. | Decay Rate |
| ID |  |  |  |  |  | Imp. | Perv. | (in.) | (in.) | $\mathrm{in} / \mathrm{hr}$ | $\mathrm{in} / \mathrm{hr}$ | $1 / \mathrm{sec}$ |
| 10 | ES4735 | 4069 | 67.1 | 13.5 | . 0557 | . 015 | . 323 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 15 | ES1570 | 2764 | 56.7 | 18.7 | . 0495 | . 021 | . 344 | . 13 | . 20 | 4.00 | 0.15 | 0.000833 |
| 20 | TCS34615 | 4766 | 440.2 | 18.9 | . 0168 | . 015 | . 327 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 30 | TCS16150 | 2203 | 55.8 | 8.7 | . 0489 | . 054 | . 340 | . 28 | . 20 | 4.00 | 0.15 | 0.000833 |
| 40 | TCS14660 | 1467 | 38.9 | 5.7 | . 0340 | . 067 | . 350 | . 35 | . 20 | 4.00 | 0.15 | 0.000833 |
| 42 | TCS27735 | 3031 | 210.9 | 15.0 | . 0273 | . 021 | . 314 | . 13 | . 20 | 4.00 | 0.15 | 0.000833 |
| 45 | TCS12825 | 3568 | 187.2 | 40.7 | . 0267 | . 019 | . 336 | . 12 | . 20 | 4.00 | 0.15 | 0.000833 |
| 47 | DS4275 | 3251 | 79.2 | 30.0 | . 0499 | . 015 | . 250 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 50 | E35550 | 1107 | 24.3 | 20.3 | . 0408 | . 015 | . 314 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 52 | D1S1450 | 3712 | 107.3 | 21.1 | . 0221 | . 015 | . 302 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 55 | BS2120 | 2408 | 74.4 | 18.5 | . 0337 | . 016 | . 329 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 57 | GS7635 | 3620 | 430.8 | 5.7 | . 0155 | . 016 | . 343 | . 11 | . 20 | 4.00 | 0.15 | 0.000833 |
| 60 | E1S1420 | 3446 | 58.3 | 1.1 | . 0768 | . 015 | . 350 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 62 | GS6651 | 3350 | 118.3 | 1.8 | . 0291 | . 034 | . 342 | . 19 | . 20 | 4.00 | 0.15 | 0.000833 |
| 63 | CS770 | 861 | 32.8 | 10.8 | . 0241 | . 045 | . 344 | . 24 | . 20 | 4.00 | 0.15 | 0.000833 |
| 65 | E1S2610 | 2915 | 116.5 | 17.7 | . 0322 | . 017 | . 330 | . 11 | . 20 | 4.00 | 0.15 | 0.000833 |
| 70 | TCS11415 | 3808 | 316.3 | 13.6 | . 0193 | . 027 | 329 | . 16 | . 20 | 4.00 | 0.15 | 0.000833 |
| 72 | GS5255 | 1805 | 46.0 | 20.8 | . 0383 | . 025 | 346 | . 15 | . 20 | 4.00 | 0.15 | 0.000833 |
| 75 | DS5785 | 7570 | 886.1 | 15.0 | . 0171 | . 016 | . 324 | . 11 | . 20 | 4.00 | 0.15 | 0.000833 |
| 80 | ES3890 | 1851 | 25.7 | 5.4 | . 0585 | . 015 | . 339 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 82 | TCS18495 | 3565 | 86.7 | 22.4 | . 0526 | . 030 | . 327 | . 17 | . 20 | 4.00 | 0.15 | 0.000833 |
| 85 | TCS33080 | 1955 | 55.2 | 7.5 | . 0368 | . 015 | . 347 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 90 | TCS32205 | 2433 | 140.3 | 4.4 | . 0299 | . 015 | . 341 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 95 | TCS30205 | 2891 | 222.7 | 5.3 | . 0225 | . 015 | . 335 | . 10 | 20 | 4.00 | 0.15 | 0.000833 |


| Table 5 (Continued) Post-development Hydrologic Model (RUNOFF) Parameters |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Subcatch- | Load <br> Point | Width$(\mathrm{ft})$ | Area <br> (ac) | $\begin{gathered} \text { DCIA } \\ \% \\ \hline \end{gathered}$ | $\begin{gathered} \text { Slope } \\ \text { fyft } \end{gathered}$ | Overiand <br> Roughness |  | DepressionStorage |  | Horton Infiltration Parameters |  |  |
| ment |  |  |  |  |  |  |  | Imp. <br> (in.) | Perv.(in.) | $\begin{aligned} & \text { Max. } \\ & \text { inghr } \end{aligned}$ | Min. in/hr | Decay Rate $1 / \mathrm{sec}$ |
| ID |  |  |  |  |  | Imp. | Perv. |  |  |  |  |  |
| 101 | A2AS1180 | 2259 | 94.1 | 13.7 | . 0318 | . 040 | . 326 | . 22 | . 20 | 4.00 | 0.15 | 0.000833 |
| 102 | A2A5510 | 824 | 10.7 | 18.8 | . 0547 | . 015 | . 297 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 104 | A2S1940 | 1830 | 30.6 | 5.9 | . 0504 | . 026 | . 339 | . 15 | . 20 | 4.00 | 0.15 | 0.000833 |
| 105 | A2B5810 | 857 | 14.5 | 3.0 | . 0447 | . 015 | . 345 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 106 | A2BS310 | 405 | 4.9 | 13.3 | . 0287 | . 015 | . 316 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 107 | A2S550 | 1171 | 22.7 | 19.0 | . 0606 | . 015 | . 296 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 109 | AS2640 | 2325 | 48.0 | 15.3 | . 0680 | . 015 | . 309 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 110 | A1S1370 | 1706 | 51.6 | 13.5 | . 0468 | . 022 | . 322 | . 13 | . 20 | 4.00 | 0.15 | 0.000833 |
| 201 | FS1235 | 1461 | 13.6 | 52.8 | . 0457 | . 043 | . 329 | . 23 | . 20 | 4.00 | 0.15 | 0.000833 |
| 202 | FS825 | 522 | 7.1 | 42.3 | . 0575 | . 015 | . 326 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 301 | E25340 | 579 | 9.0 | 9.8 | . 0416 | . 015 | . 347 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 302 | ES6140 | 1117 | 18.4 | 12.0 | . 0567 | . 015 | . 330 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 771 | TCS23915 | 5136 | 193.3 | 19.6 | . 0381 | . 022 | . 317 | . 13 | . 20 | 4.00 | 0.15 | 0.000833 |
| 772 | TCS20745 | 2156 | 81.2 | 23.0 | . 0402 | . 024 | . 309 | . 14 | . 20 | 4.00 | 0.15 | 0.000833 |
| 773 | GS1655 | 3080 | 210.4 | 11.5 | . 0282 | . 027 | . 345 | . 16 | . 20 | 4.00 | 0.15 | 0.000833 |
| 1031 | A253440 | 1600 | 26.4 | 14.6 | . 0472 | . 015 | . 345 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 1032 | A2CS745 | 1878 | 47.7 | 3.4 | . 0431 | . 015 | . 350 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 1081 | A55460 | 722 | 14.2 | 16.7 | . 0558 | . 015 | . 305 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 1082 | A4S260 | 643 | 12.6 | 26.2 | . 0539 | . 015 | . 268 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 1083 | A3S450 | 1818 | 30.6 | 44.4 | . 0551 | . 019 | . 317 | . 12 | . 20 | 4.00 | 0.15 | 0.000833 |
| 1084 | AS6670 | 1507 | 37.9 | 13.2 | . 0408 | . 046 | . 330 | . 25 | . 20 | 4.00 | 0.15 | 0.000833 |
| 1086 | AS4390 | 1692 | 22.7 | 13.7 | . 0786 | . 015 | . 335 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |
| 1087 | AS5720 | 1105 | 18.5 | 25.1 | . 0621 | . 015 | . 332 | . 10 | . 20 | 4.00 | 0.15 | 0.000833 |

## Section 6

## Hydraulic Model Development

Data for the hydraulic model primarily came from the HEC-2 model of Turkey Creek, the $2-\mathrm{ft}$ contour data, and the USGS quad sheets. For the Turkey Creek mainstem, the model data were taken directly from the HEC-2 input file. For the remainder of the watershed that was within the 2 - ft contour coverage, cross-sections and invert elevations were taken from the 2 - ft data. For other areas of the watershed, crosssections and invert data were estimated from the USGS quad sheets.

Since the hydraulic model does not extend fully to the Brazos River, a normal depth outfall option was used at the model boundary. This option is based on the underlying assumption that the most downstream portion of the model is not significantly influenced by backwater from the Brazos River, which is an adequate assumption. Initial conditions in the hydraulic model were set to dry, with the exception of the one existing lake that is in the model. For this lake, the initial conditions were set equal to the water level in the lake that was taken from the $2-\mathrm{ft}$ contours.

The minor stream crossings (i.e., culverts) that are currently within the project area were not included in the hydraulic model, partly due to the fact that no data were available for them. Additionally, they all have fairly small contributing areas, so they should not have a significant impact on the flood hydrographs.

There are 10 planned stream crossings within the project area. Currently, there are not planned sizes/configurations for these culverts. However, these culverts will likely have an impact of the flood hydrographs, so it was necessary to estimate and model these culverts under post-development conditions. The sizing of the culverts for the post-development condition was based on the following methodology:

- Determine the 25 -year post-development peak flow rates at the stream crossing locations
- Determine the approximate upstream and downstream invert elevations at the stream crossings from the $2-\mathrm{ft}$ contours
- Determine approximate culvert lengths from drawing files of roadways
- Determine depth of flow for the 25 -year storm event to establish height of the proposed culverts
- Size culverts to pass the 25-year post-development flows using head loss equal to the difference between upstream and downstream invert elevations or approximately 1 foot, whichever is larger
- Set top-of-road elevations equal to the 100-year post-development stage with the culverts in place

A minor complication in this process arose from an observation noted in the field regarding the 2 - ft contour data. By comparing the contour data in the field to observed channel geometries, it does not appear that the $2-\mathrm{ft}$ contour data contain much of the incised channel. That is, the 2 -ft contour data appear to be reasonable from top-of-bank to top-of-bank but appear to underestimate the cross-section below the top-of-bank elevation. This underestimation will result in predicted flood stages within the project area that are conservatively high. Additionally, flow depths for estimating culvert heights are likely too low, due to the fact that the actual area in flow would be narrower and taller than the area being represented in the model. Therefore, all proposed stream crossings were modeled with lowered inverts in order to obtain a more realistic culvert geometry. Figure 4 shows the arbitrary numbers assigned to the 10 culverts, and Table 6 contains the corresponding culvert data. Culvert geometries may need to be altered slightly during final design based on additional site data. However, the culvert capacities need to remain similar to those listed in Table 6 in order for the findings of this report to remain valid.

| Table 6 <br> Design Parameters for New Culverts |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{gathered} \text { Culvert } \\ \text { ID } \end{gathered}$ | Upstream <br> Model <br> Node | Downstream Model Node | Upstream lnvert Elevation $(f t-N A V D)$ | Downstream <br> Invert <br> Elevation <br> (ft-NAVD) | Design Length (fi) | Design Flow (cfs) | Approx. Design Head Loss (ft) | $\left\lvert\, \begin{gathered} \text { Culvert } \\ \text { Type } \end{gathered}\right.$ | $\begin{gathered} \text { Number } \\ \text { of } \\ \text { Barrels } \end{gathered}$ | Culvert Height (ft) | Culvert Width <br> (ft) | Top-of-road <br> Elevation <br> (ft-NAVD) |
| 1 | E25340 | E2S300 | 300.5 | 297.5 | 40 | 35 | 2.9 | RCP | 1 | 2.0 |  | 305 |
| 2 | ES5950 | ES5840 | 276.9 | 276.5 | 110 | 111 | 1.0 | RCP | 1 | 4.5 |  | 286.2 |
| 3 | E35550 | E3S440 | 282.5 | 279.5 | 110 | 104 | 4.2 | RCP | 1 | 3.5 |  | 287.4 |
| 4 | TCS19615 | TCS19505 | 232.6 | 232.0 | 110 | 3540 | 1.0 | Box | 4 | 10.0 | 11.0 | 248.7 |
| 5 | FS575 | TCS19885 | N/A | N/A | 100 | 62 | 1.0 | RCP | 1 | 3.5 |  | N/A |
| 6 | TCS21590 | TCS21505 | 238.2 | 237.8 | 85 | 2480 | 1.0 | Box | 3 | 10.0 | 10.0 | 255.5 |
| 7 | A1S205 | A15120 | 247.1 | 245.0 | 85 | 165 | 1.0 | Box | 1 | 4.0 | 6.0 | 255.6 |
| 8 | A2BS695 | A2B5605 | 294.8 | 293.3 | 115 | 49 | 1.9 | RCP | 1 | 2.5 |  | 301.3 |
| 9 | A2S2540 | A2S2450 | 288.5 | 285.1 | 90 | 221 | 1.5 | Box | 1 | 3.0 | 8.0 | 294.8 |
| 10 | A2A5810 | A2AS665 | 280.0 | 279.0 | 115 | 222 | 1.0 | Box | 1 | 4.0 | 10.0 | 287.8 |

## Section 7

## Model Results

The pre- and post-development models were run for the 25 - and 100 -year storm events. As noted above, the only controls in the post-development model were the culverts listed in Table 6. Comparison of peak water surface elevations and peak flows are summarized in Tables 7 and 8, respectively. Inundated areas for the 100year storm event are shown in Figure 5 within the project area. As shown in the Table 7,25 - and 100-year peak water surface elevations are similar under pre- and postdevelopment conditions, with some post-development stages being slightly higher and some slightly lower. Table 8 shows similar results for peak flows. The difference in the inundated areas between the two conditions is virtually indiscernible for the 100 -year event.

| Table 7 <br> Summary of Peak Water Surface Elevations |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Invert <br> Elevation <br> (ft-NAVD) | Road Name or Stream Crossing Number | Road Elevation (ft-NAVD) | 25-year, 24-hour |  | 100-year, 24-hour |  |
| Node ID |  |  |  | Pre-dev. Stage | Post-dev. Stage | Pre-dev. Stage | Post-dev. Stage |
| Reach Name |  |  |  | (ft-NAVD) | (ft-NAVD) | (ft-NAVD) | (ft-NAVD) |
| Turkey Creek Mainstem |  |  |  |  |  |  |  |
| TCS7034 | 201.5 |  |  | 212.4 | 212.5 | 214.7 | 214.6 |
| TCS8150 | 208.3 |  |  | 219.1 | 219.2 | 221.4 | 221.4 |
| TCS8980 | 210.8 |  |  | 224.7 | 224.6 | 227.1 | 226.8 |
| TCS9955 | 212.0 |  |  | 225.9 | 225.9 | 228.2 | 228.1 |
| TCS10602 | 213.0 |  |  | 227.7 | 227.7 | 230.0 | 229.9 |
| TCS10628 | 213.2 | London Bridge (County Road) | 228.5 | 229.7 | 229.7 | 231.9 | 231.8 |
| TCS11415 | 216.0 |  |  | 230.4 | 230.5 | 232.8 | 232.7 |
| TCS12825 | 218.6 |  |  | 232.5 | 232.6 | 235.1 | 235.0 |
| TCS14660 | 221.3 |  |  | 237.0 | 237.0 | 239.6 | 239.5 |
| TCS15370 | 222.3 |  |  | 238.1 | 238.1 | 240.6 | 240.5 |
| TCS16150 | 225.2 |  |  | 238.5 | 238.6 | 241.1 | 241.0 |
| TCS18495 | 232.9 |  |  | 244.0 | 244.0 | 245.7 | 245.5 |
| TCS19505 | 235.3 |  |  | 245.4 | 245.4 | 246.9 | 246.7 |
| TCS19615 | 235.6 | 4 |  | 245.7 | 246.4 | 247.1 | 248.7 |
| TCS19885 | 236.2 |  |  | 246.3 | 246.7 | 247.6 | 248.9 |
| TCS20745 | 238.5 |  |  | 248.4 | 248.4 | 249.6 | 249.9 |
| TCS21505 | 240.8 |  |  | 251.8 | 251.8 | 253.1 | 253.1 |
| TCS21590 | 241.2 | 6 |  | 252.1 | 252.8 | 253.4 | 255.5 |
| TCS22605 | 245.1 |  |  | 255.6 | 255.6 | 256.9 | 257.2 |
| TCS23915 | 248.8 |  |  | 261.9 | 261.8 | 263.2 | 263.1 |
| TCS24435 | 250.4 |  |  | 262.0 | 261.9 | 263.4 | 263.3 |
| TCS27735 | 260.6 |  |  | 269.3 | 269.3 | 270.4 | 270.4 |
| TCS30205 | 270.1 |  |  | 279.4 | 279.4 | 280.6 | 280.6 |
| TCS32205 | 278.2 |  |  | 285.8 | 285.8 | 287.5 | 287.5 |
| TCS32655 | 280.6 |  |  | 286.2 | 286.2 | 287.8 | 287.8 |
| TCS33080 | 283.0 |  |  | 290.0 | 289.8 | 290.6 | 290.5 |
| TCS33755 | 284.8 |  |  | 292.5 | 292.5 | 293.4 | 293.4 |
| TCS34615 | 288.3 |  |  | 293.9 | 293.9 | 294.8 | 294.8 |
| Tributary A |  |  |  |  |  |  |  |
| AS1340 | 245.0 |  |  | 253.1 | 253.5 | 254.4 | 254.7 |
| AS1740 | 248.7 |  |  | 255.6 | 255.9 | 256.7 | 257.0 |
| AS2140 | 251.3 |  |  | 258.4 | 258.6 | 259.2 | 259.4 |
| AS2640 | 253.5 |  |  | 261.5 | 261.8 | 262.6 | 262.9 |
| AS3150 | 255.3 |  |  | 263.0 | 263.3 | 264.2 | 264.5 |
| AS3720 | 257.7 |  |  | 266.3 | 266.6 | 267.4 | 267.7 |
| AS4030 | 261.0 |  |  | 266.6 | 267.0 | 267.7 | 268.0 |
| AS4390 | 263.3 |  |  | 268.6 | 269.1 | 269.4 | 269.8 |
| AS5110 | 273.0 |  |  | 276.2 | 276.5 | 276.7 | 276.9 |
| AS5380 | 276.0 |  |  | 278.9 | 279.1 | 279.4 | 279.6 |
| AS5720 | 281.7 |  |  | 284.4 | 284.6 | 284.8 | 285.0 |
| AS6090 | 286.0 |  |  | 289.4 | 289.6 | 289.9 | 290.1 |
| AS6670 | 295.8 |  |  | 298.5 | 298.6 | 298.9 | 299.0 |


| Table 7 (Continued) Summary of Peak Water Surface Elevations |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Model | Invert Elevation (ft-NAVD) | Road Name or Stream Crossing Number | Road Elevation (ft-NAVD) | 25-year, 24-hour |  | 100-year, 24-hour |  |
| Node ID |  |  |  | Pre-dev. <br> Stage | $\begin{gathered} \text { Post-dev. } \\ \text { Stage } \end{gathered}$ | Pre-dev. Stage | Post-dev. Stage |
| Reach Name |  |  |  | (ft-NAVD) | (ft-NAVD) | (ft-NAVD) | (ft-NAVD) |
| Tributary D |  |  |  |  |  |  |  |
| DS3015 | 255.0 |  |  | 263.0 | 263.0 | 264.4 | 264.4 |
| DS4275 | 264.0 |  |  | 272.5 | 272.5 | 273.3 | 273.2 |
| DS5785 | 270.0 |  |  | 278.1 | 278.1 | 279.0 | 279.1 |
| Tributary D1 |  |  |  |  |  |  |  |
| D151450 | 284.0 |  |  | 287.7 | 287.7 | 288.1 | 288.1 |
| Tributary E |  |  |  |  |  |  |  |
| ES1570 | 243.0 |  |  | 246.5 | 246.6 | 247.0 | 247.1 |
| ES2890 | 245.0 |  |  | 252.2 | 252.3 | 253.2 | 253.3 |
| ES3890 | 257.0 |  |  | 260.0 | 260.1 | 260.4 | 260.5 |
| ES4735 | 265.0 |  |  | 269.1 | 269.3 | 269.7 | 269.8 |
| ES5315 | 274.0 |  |  | 275.8 | 275.8 | 276.0 | 276.0 |
| ES5840 | 279.7 |  |  | 282.0 | 282.0 | 282.3 | 282.3 |
| ES5950 | 279.9 | 2 |  | 282.5 | 283.5 | 282.9 | 283.6 |
| ES6140 | 283.5 |  |  | 285.9 | 285.9 | 286.2 | 286.1 |
|  |  |  |  |  |  |  |  |
| E1S1420 | 255.0 |  |  | 260.0 | 260.2 | 260.8 | 260.9 |
| E1S2360 | 270.0 |  |  | 272.7 | 272.9 | 273.2 | 273.4 |
| E1S2610 | 271.0 |  |  | 275.5 | 275.7 | 276.2 | 276.4 |
| Tributary E2 |  |  |  |  |  |  |  |
| E2S300 | 300.0 |  |  | 301.4 | 301.3 | 301.5 | 301.5 |
| E2S340 | 303.0 | 1 |  | 304.3 | 303.3 | 304.4 | 305.0 |
| Tributary E3 |  |  |  |  |  |  |  |
| E3S440 | 282.5 |  |  | 283.6 | 283.7 | 283.7 | 283.8 |
| E3S550 | 285.5 | 3 |  | 287.5 | 285.7 | 287.8 | 287.4 |
| Tributary F |  |  |  |  |  |  |  |
| FS575 | 256.0 | 5 |  | 256.9 | 257.0 | 257.1 | 257.2 |
| FS825 | 252.0 |  |  | 256.9 | 257.1 | 257.2 | 257.3 |
| FS1190 | 264.0 |  |  | 264.9 | 264.9 | 265.0 | 265.0 |
| FS1235 | 280.0 |  |  | 280.5 | 280.6 | 280.6 | 280.7 |


| Table 8 <br> Summary of Peak Flow Rates |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Upstream <br> Node | Downstream Node | Length <br> (ft) | 25-year, 24-hour |  | 100-year, 24-hour |  |
| Conduit ID |  |  |  | Pre-dev. Flow | Post-dev. Flow | Pre-dev. Flow | Post-dev. Flow |
| Reach Name |  |  |  | (cfs) | (cfs) | (cfs) | (cfs) |
| Turkey Creek Mainstem |  |  |  |  |  |  |  |
| TCS8150 | TCS8150 | TCS7034 | 1116 | 4590 | 4660 | 6940 | 6900 |
| TCS8980 | TCS8980 | TCS8150 | 830 | 4590 | 4660 | 6950 | 6900 |
| TCS9955 | TCS9955 | TCS8980 | 975 | 4590 | 4670 | 6960 | 6910 |
| TCS10602 | TCS10602 | TCS9955 | 674 | 4610 | 4680 | 6980 | 6930 |
| TCS10628R | TCS10628 | TCS10602 | 26 | 243 | 282 | 2630 | 2630 |
| TCS10628 | TCS10628 | TCS10602 | 26 | 4370 | 4410 | 4690 | 4660 |
| TCS11415 | TCS11415 | TCS10628 | 787 | 4620 | 4690 | 7000 | 6940 |
| TCS12825 | TCS12825 | TCS11415 | 1410 | 4440 | 4500 | 6690 | 6620 |
| TCS14660 | TCS14660 | TCS12825 | 1835 | 4370 | 4420 | 6550 | 6470 |
| TCS15370 | TCS15370 | TCS14660 | 710 | 4030 | 4060 | 6050 | 5980 |
| TCS16150 | TCS16150 | TCS15370 | 780 | 3420 | 3430 | 5160 | 5040 |
| TCS18495 | TCS18495 | TCS16150 | 2345 | 3570 | 3540 | 5380 | 5140 |
| TCS19505 | TCS19505 | TCS18495 | 1010 | 3510 | 3490 | 5300 | 5070 |
| TCS19615 | TCS19615 | TCS19505 | 110 | 3540 | 3500 | 5360 | 5090 |
| TCS19885 | TCS19885 | TCS19615 | 270 | 3560 | 3510 | 5380 | 5100 |
| TCS20745 | TCS20745 | TCS19885 | 860 | 3580 | 3560 | 5440 | 5200 |
| TCS21505 | TCS21505 | TCS20745 | 760 | 2570 | 2600 | 4030 | 4000 |
| TCS21590 | TCS21590 | TCS21505 | 85 | 2480 | 2510 | 3890 | 3880 |
| TCS22605 | TCS22605 | TCS21590 | 1015 | 2480 | 2520 | 3900 | 3890 |
| TCS23915 | TCS23915 | TCS22605 | 1310 | 2490 | 2520 | 3920 | 3960 |
| TCS24435 | TCS24435 | TCS23915 | 520 | 1310 | 1320 | 2060 | 2070 |
| TCS27735 | TCS27735 | TCS24435 | 3300 | 1440 | 1440 | 2130 | 2120 |
| TCS30205 | TCS30205 | TCS27735 | 2470 | 1250 | 1250 | 1770 | 1770 |
| TCS32205 | TCS32205 | TCS30205 | 2000 | 1000 | 1000 | 1410 | 1410 |
| TCS32655 | TCS32655 | TCS32205 | 450 | 835 | 831 | 1140 | 1140 |
| TCS33080 | TCS33080 | TCS32655 | 425 | 894 | 890 | 1220 | 1220 |
| TCS33755 | TCS33755 | TCS33080 | 675 | 738 | 738 | 1010 | 1010 |
| TCS34615 | TCS34615 | TCS33755 | 860 | 847 | 847 | 1120 | 1120 |
| Tributary A |  |  |  |  |  |  |  |
| AS1340 | AS1340 | TCS20745 | 1340 | 1270 | 1400 | 1740 | 1880 |
| AS1740 | AS1740 | AS1340 | 400 | 1160 | 1290 | 1610 | 1730 |
| AS2140 | AS2140 | AS1740 | 400 | 1170 | 1290 | 1610 | 1740 |
| AS2640 | AS2640 | AS2140 | 500 | 1170 | 1290 | 1610 | 1740 |
| AS3150 | AS3150 | AS2640 | 510 | 1050 | 1160 | 1440 | 1570 |
| AS3720 | AS3720 | AS3150 | 570 | 1050 | 1170 | 1450 | 1580 |
| AS4030 | AS4030 | AS3720 | 310 | 434 | 529 | 586 | 684 |
| AS4390 | AS4390 | AS4030 | 360 | 449 | 546 | 603 | 706 |
| AS5110 | AS5110 | AS4390 | 720 | 259 | 308 | 357 | 412 |
| AS5380 | AS5380 | AS5110 | 270 | 260 | 311 | 358 | 415 |
| AS5720 | AS5720 | AS5380 | 340 | 215 | 256 | 295 | 344 |
| AS6090 | AS6090 | AS5720 | 370 | 149 | 175 | 207 | 238 |
| AS6670 | AS6670 | AS6090 | 580 | 108 | 122 | 151 | 168 |


| Table 8 (Continued) Summary of Peak Flow Rates |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{gathered} \text { Conduit } \\ \text { ID } \\ \hline \end{gathered}$ | Upstream Node | Downstream Node | Length <br> (ft) | 25-year, 24-hour |  | 100-year, 24-hour |  |
|  |  |  |  | $\begin{array}{\|c\|} \hline \text { Pre-dev. } \\ \text { Flow } \\ \text { (cfs) } \\ \hline \end{array}$ | $\begin{array}{\|c\|} \hline \text { Post-dev. } \\ \text { Flow } \\ \text { (cfs) } \end{array}$ | $\begin{array}{\|c} \text { Pre-dev. } \\ \text { Flow } \\ \text { (cfs) } \end{array}$ | Post-dev. <br> Flow <br> (cfs) |
| Tributary A1 |  |  |  |  |  |  |  |
| A1S120 | A1S120 | AS1340 | 120 | 141 | 187 | 190 | 255 |
| A1S205 | A1S205 | A1S120 | 85 | 146 | 189 | 197 | 271 |
| A1S430 | A1S430 | A1S205 | 225 | 140 | 373 | 197 | 566 |
| A15940 | A1S940 | A15430 | 510 | 140 | 159 | 197 | 220 |
| A1S1370 | A1S1370 | A1S940 | 430 | 141 | 166 | 198 | 229 |
| Tributary A2 |  |  |  |  |  |  |  |
| A2S550 | A2S550 | AS3720 | 550 | 643 | 698 | 902 | 974 |
| A2S1260 | A2S1260 | A2S550 | 710 | 583 | 634 | 821 | 891 |
| A2S1370 | A2S1370 | A2S1260 | 110 | 524 | 572 | 741 | 809 |
| A2S1940 | A2S1940 | A2S1370 | 570 | 318 | 320 | 438 | 453 |
| A2S2450 | A2S2450 | A2S1940 | 510 | 220 | 220 | 305 | 314 |
| A2S2540 | A2S2540 | A2S2450 | 90 | 221 | 220 | 306 | 314 |
| A2S2790 | A2S2790 | A2S2540 | 250 | 221 | 220 | 306 | 365 |
| A253440 | A2S3440 | A2S2790 | 650 | 104 | 104 | 138 | 138 |
| Tributary A2A |  |  |  |  |  |  |  |
| A2AS320 | A2AS320 | A2S1370 | 320 | 217 | 268 | 315 | 373 |
| A2AS510 | A2AS510 | A2AS320 | 190 | 218 | 269 | 316 | 374 |
| A2AS665 | A2AS665 | A2AS510 | 155 | 179 | 223 | 265 | 316 |
| A2AS810 | A2AS810 | A2AS665 | 145 | 180 | 223 | 266 | 315 |
| A2AS1180 | A2AS1180 | A2AS810 | 370 | 181 | 342 | 268 | 336 |
| Tributary A2B |  |  |  |  |  |  |  |
| A2BS200 | A2BS200 | A2S1260 | 200 | 66 | 67 | 90 | 87 |
| A2BS310 | A2B5310 | A2BS200 | 110 | 66 | 67 | 90 | 87 |
| A2BS440. | A2BS440 | A2BS310 | 130 | 49 | 49 | 66 | 64 |
| A2BS605 | A2BS605 | A2BS440 | 165 | 49 | 49 | 66 | 64 |
| A2BS695 | A2BS695 | A2BS605 | 90 | 49 | 49 | 67 | 64 |
| A2B5810 | A2BS810 | A2BS695 | 115 | 49 | 54 | 67 | 67 |
| Tributary A2C |  |  |  |  |  |  |  |
| A2C5745 | A2C5745 | A2S2790 | 745 | 129 | 129 | 183 | 183 |
| Tributary A3 |  |  |  |  |  |  |  |
| A3S450 | A3S450 | AS4390 | 450 | 109 | 192 | 147 | 237 |
| Tributary A4 |  |  |  |  |  |  |  |
| A4S260 | A4S260 | AS6090 | 260 | 42 | 68 | 57 | 86 |
| Tributary A5 |  |  |  |  |  |  |  |
| A5S460 | A5S460 | AS5380 | 460 | 46 | 62 | 63 | 82 |
| Tributary B |  |  |  |  |  |  |  |
| BS1050 | BS1050 | TCS21505 | 1050 | 191 | 219 | 270 | 301 |
| BS2120 | BS2120 | BS1050 | 1070 | 200 | 236 | 280 | 322 |
| Tributary C |  |  |  |  |  |  |  |
| CS335 | CS335 | TCS24435 | 335 | 70 | 70 | 100 | 100 |
| CS770 | CS770 | CS335 | 435 | 70 | 70 | 101 | 101 |


| Table 8 (Continued) Summary of Peak Flow Rates |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Upstream Node | Downstream Node | Length <br> (ft) | 25-year, 24-hour |  | 100-year, 24-hour |  |
| Conduit <br> ID <br> Reach Name |  |  |  | Pre-dev. <br> Flow <br> (cfs) | Post-dev. <br> Flow <br> (cfs) | Pre-dev. Flow (cfs) | Post-dev. <br> Flow <br> (cfs) |
| Tributary D |  |  |  |  |  |  |  |
| DS3015 | DS3015 | TCS23915 | 3015 | 1510 | 1500 | 2100 | 2100 |
| DS4275 | DS4275 | DS3015 | 1260 | 1620 | 1610 | 2220 | 2220 |
| DS5785 | DS5785 | DS4275 | 1510 | 1260 | 1260 | 1750 | 1760 |
| Tributary D1 |  |  |  |  |  |  |  |
| D151450 | D1S1450 | DS3015 | 1450 | 348 | 347 | 468 | 467 |
| Tributary E |  |  |  |  |  |  |  |
| ES1570 | ES1570 | TCS14660 | 1570 | 919 | 996 | 1290 | 1370 |
| ES2890 | ES2890 | ES1570 | 1320 | 809 | 879 | 1130 | 1210 |
| ES3890 | ES3890 | ES2890 | 1000 | 479 | 529 | 648 | 697 |
| ES4735 | ES4735 | ES3890 | 845 | 402 | 449 | 544 | 588 |
| ES5315 | ES5315 | ES4735 | 580 | 100 | 102 | 135 | 134 |
| ES5840 | ES5840 | ES5315 | 525 | 102 | 104 | 137 | 136 |
| ES5950 | ES5950 | ES5840 | 110 | 100 | 143 | 137 | 135 |
| ES6140 | ES6140 | ES5950 | 190 | 102 | 700 | 138 | 138 |
| Tributary E1 |  |  |  |  |  |  |  |
| E1S1420 | E151420 | ES2890 | 1420 | 466 | 499 | 650 | 688 |
| E1S2360 | E1S2360 | E1S1420 | 940 | 272 | 318 | 385 | 441 |
| E1S2610 | E1S2610 | E1S2360 | 250 | 291 | 341 | 409 | 467 |
| Tributary E2 |  |  |  |  |  |  |  |
| E2S340 | E2S340 | E2S300 | 40 | 35 | 32 | 48 | 41 |
| E2S300 | E2S300 | ES6140 | 300 | 35 | 31 | 47 | 41 |
| Tributary E3 |  |  |  |  |  |  |  |
| E3S440 | E3S440 | ES4735 | 440 | 69 | 92 | 97 | 120 |
| E3S550 | E3S550 | E3S440 | 110 | 69 | 94 | 97 | 121 |
| Tributary F |  |  |  |  |  |  |  |
| FS575 | FS575 | TCS19885 | 575 | 41 | 62 | 73 | 95 |
| FS825 | FS825 | FS575 | 250 | 51 | 68 | 81 | 102 |
| FS1190 | FS1190 | FS825 | 365 | 52 | 59 | 68 | 75 |

## Section 8

## Summary of Recommendations

Based on the results in Section 7, it appears the additional culverts may effectively serve as sufficient peak flow controls for the development. No additional peak flow control facilities are recommended.

It is recommended that roadside swales within the development be designed to convey at least the 10 -year storm event. Design flow methodologies and standards for open channel design should be consistent with the City's Drainage Design Guideline Manual.

