

HOLLAND COMMERCIAL ADDITION

DRAINAGE REPORT



OCTOBER 2006

Introduction

The Holland Commercial Addition is an approximate 12-acre tract of land located at the northwest corner of Kellogg and Tyler Road in west Wichita. The site is bounded on the north by Belview, on the east by Tyler Road, on the south by Kellogg Drive, and on the west by Byron. (A copy of the USGS quadrangle map showing the location of the subject property is attached herewith.)

Residential development lies to the west and north of the site. Commercial and industrial uses lie to the east and south. The original, modern land use for the site was a mixture of residential, commercial, and agricultural uses. The property has been rezoned to allow general commercial types of use and is in the process of being re-platted. (A 2003 aerial photograph showing existing land uses is attached herewith.)

Existing Conditions

Presently, the site is a mixture of vacant land, commercial property and some residential property. An un-named tributary of the Cowskin Creek drains north to south through the approximate center of the site. The land has natural slopes ranging from less than 1% to roughly 3%. According to the USGS Soil Survey, the predominant soil type is a Milan loam series material.

The tributary drains through the site and enters an 8'x6' RCB structure under Kellogg. The box conveys the drainage into a storm water channel south of Kellogg and then ultimately to the Cowskin. Box structures under the abandoned RR track that lies south of and parallel to Kellogg and Harry Street are 2-12'x7' and 2-13'x7' respectively.

The upstream drainage basin for the un-named tributary is approximately 120 acres. Land use within the drainage basin is predominantly residential in character. (A 2003 aerial photo showing land use within the drainage basin is attached herewith.) Upstream, storm water is directed to the site via overland flow and through open ditches along Belview, Byron, and Callahan Streets. There are two 36"x60" CMP cross road pipes under Belview that convey storm water onto the subject property. Storm water is presently conveyed through the site in an open ditch from Belview to the RCB under Kellogg.

Proposed Conditions

The site is anticipated on being developed as a multi-lot commercial subdivision. A mixture of retail, restaurant, and other uses are proposed. Typically, commercial developments will increase the impervious area of the property over the existing land use. Such would be true with the Holland tract. (Copies of the proposed plat and Community Unit Plan are attached herewith.)

Developed conditions will take advantage of the natural grades on the site as the site develops. Cross parcel drainage is contemplated as part of the plat. A petition guaranteeing the extension of the 8'x6' RCB through the site to Belview will be provided as a condition of the plat. A drainage easement showing the anticipated location of the box structure is shown on the plat. On-site drainage is will be achieved through localized connections to the proposed RCB structure.

Analysis

The box structure under Kellogg was designed by PEC as part of the overall west Kellogg improvements. Design information from PEC indicated that the box was designed for a drainage basin of 118 acres and a maximum Q_{100} of approximately 405 cfs. (The information obtained from PEC is attached herewith.)

A drainage study of the basin was also conducted by Young & Associates under contract with Austin Miller, PA who originally initiated the platting for the property owner. Young & Associates estimated a larger drainage basin at 164 acres and estimated a larger Q_{100} of 466 cfs. (The drainage study by Young & Associates is attached herewith.)

The differences between the two numbers are probably a result of differences in the methodology used for estimating the run-off for the properties and the estimated size of the drainage basin.

Using the Rational Method, Q_{100} for the Holland tract assuming existing conditions is estimated to be 30 cfs. The Q_{100} for the fully developed commercial site is estimated to be approximately 73 cfs. (A drainage plan for the Holland plat is attached herewith.)

Time of concentration for the entire drainage is estimated to be approximately 58 minutes based upon the Young & Associates study. On-site T_c is estimated to be 15 minutes or less. Accordingly, on-site detention is not recommended for the Holland tract as any detention would possibly add to the upstream peak. The post-developed Q would have the opportunity to clear the RCB prior to the arrival of the upstream peak discharge.

The PEC study assumed inlet control and established 1 foot of head water into the box structure at the south end of the subject tract. Headwater was confirmed using a quick check against FHWA Hydraulic Engineering Circular No. 5. (See chart attached herewith.) The hydraulic grade line was carried through the length of the site to establish the minimum pad elevation for commercial subdivision; however, an in-depth engineering analysis was not performed for the purposes of platting and should be done at the time of the box design. Inlet control and flowline elevation for the new RCB inlet were assumed at the terminus near Callahan and Belview. Site specific design of on-site drainage systems will need to consider potential surcharging of any on-site inlets based upon final design of the RCB.