DP-73 - File #1
COMOTARA C.U.P.
Generally located between Rock Rd & Woodlawn, and between 21st and 29th Streets North.

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DP-73 - COMOTARA CUP - Between Woodlawn and Rock Road and bet. 21st St. & 29th St. North

File #1

M.A.P.C. Approved subject to conditions 6.12.75

B.C.C. Approved subject to conditions 7-7-75

Posted
4-30-75

ACTION

COMMITTEE		DATE
M.A.P.C.	App. subject to condition	6-12-75
B.C.C. ~~(B. Comm.)~~	~~Approved subject to~~ additional condition	7-1-75

DR-73 - CONOCARA CUP - Between Woodlawn and Rock Road and bet. 21st St. & 29th St. North

File #1

Map No. 5950
Sec. 6
Twp. 27S
Range 2E

DATA SHEET
COMMUNITY UNIT PLAN

DP 73
Z-
Filed 4-28-75

APPLICATION REQUEST: Approval of proposed planned residential development.

1. Applicant Wichita Land Company
   Address 2500 Claiborn Circle 67226 Phone 686-7451
2. Agent Van Doren-Hazard-Stallings
   Address 260 N. Rock Rd., 67206 Phone 686-7303
3. General Location Between Rock Road and Woodlawn and between
   Address
4. Proposed Use

AREA DATA

1. Acres 339.9 (ft. by ft.)
2. Existing Zoning AA & LC Proposed Zoning AA
3. Area (~~is~~) (is not) platted. Addition
4. Existing R/W ft. ft. ft.
   St. St. St.
   Proposed R/W ft. ft. ft.
   St. St. St.

HISTORY

PROCEDURE DATA

1. MAPC Meeting:

Date	Action
6-12-75	App. subject to conditions

2. Governing Body BCC

Date	Action
7-1-75	Approved sub to additional conditions

July 20, 1976

Robert Feldner, Superintendent of Central Inspection

Jack H. Galbraith, Chief Planner

DP-73 - Comotara - Between Woodlawn and Rock Road and between 21st and 29th Streets North.

The Board of City Commissioners on July 1, 1975, considered the above captioned CUP. Their action was to approve the CUP subject to the following conditions:

a. Platting of subject property within ~~one~~ three year from the date of approval by the Board of City Commissioners; or the application be considered denied and closed.

b. The development of this property shall proceed in accordance with the development plan as recommended for approval by the Planning Commission and approved by the governing body, and any substantial deviation of the plan, as determined by the Superintendent of Central Inspection and the Director of Planning, shall constitute a violation of the building permit authorizing construction of the proposed development.

c. Any major changes in this development plan shall be resubmitted to the Planning Commission and to the City Commission for its consideration.

d. The transfer of title of all or any portion of the land included within the Community Unit Plan does not constitute a termination of the plan or any portion thereof, but said plan shall run with the land for residential development and be binding upon the present owners, their successors and assigns, unless amended.

e. A sidewalk plan depicting the location of all private walks and sidewalks adjacent to public streets shall be submitted for approval at time of platting.

Please note that prior to the issuance of any building permits, and in accordance with condition "a" above, the property must be platted. A plat of Sycamore Village Addition, which covers the south half of the SE¼ Section was recorded on March 8, 1976.

Attached for your information and files is an approved copy of the CUP. If you have any questions concerning this matter, please call.

Jack H. Galbraith
Chief Planner

JHG:MM:el
Att.

July 3, 1975

Mr. Howard West, General Manager
Wichita Land Company
2500 Claiborn Circle
Wichita, Kansas 67226

Subject: Z-1707 - "AA" and "LC" to "AA"; and DP-73 Residential CUP - Between Woodlawn and Rock Road and between 21st and 29th Streets North

Dear Mr. West:

At the regular meeting of the Board of City Commissioners on July 1, 1975, the above captioned cases were considered. In the discussion of the proposed alternate street standards, there were again several questions raised as to the type of streets proposed, and who is responsible for the maintenance of the swales adjacent to the collector streets. After considerable discussion, the action of the City Commission was to approve the requests subject to the conditions as recommended by the Planning Commission and subject to the condition that in the event the proposed street standards do not prove satisfactory, and widening and curb and gutter must later be provided, property owners in the benefiting district will be subject to additional special assessments. Property owners are to be advised of such a possibility when purchasing lots with the understanding that they will not protest any additional street assessments. The City Commission made it clear that the modification of street and drainage standards is experimental and may be subject to reappraisal at a later date contingent on adequacy of performance.

Based on this condition, General Provisions #13 should be changed to read as follows:

> Adjustment of present dedicated standard street widths is granted as follows with the understanding that the City retains the option to order that all streets be improved to urban standards (as defined in the Wichita Sedgwick County Subdivision Regulations) with no cost to the City upon notification by the Department of Public Works that the streets and drainage are not functioning properly.

In addition, several of the conditions as recommended by the Planning Commission were not correctly changed on the face of the CUP. Specifically, the Planning Commission required the deletion of the phrase "if variance is granted by the Board of Zoning Appeals" from the original General Provision #13 which formerly read, "the existing silo, silo signs and logo is to be retained, if variance is granted by the Board of Zoning Appeals". Only that part of the statement "if variance is granted by the Board of Zoning Appeals" should have been deleted.

Another condition of approval was that General Provision #7 also include a reference to silo, silo sign, and logos in order that maintenance of these areas is assured by the Homeowner's Association. These changes were not made and must be corrected on the CUP in order to comply with the conditions of approval.

These corrections and clarifications, as shown on the enclosed "marked" copy should be made and four copies returned to our office at your earliest convenience. If you have any questions concerning this matter, please call.

Sincerely,

Jack H. Galbraith
Chief Planner

JHG:js

cc: VanDoren-Hazard-Stallings, 260 North Rock Road, Suite 250, 67206
Wichita Land Co., 2500 Claiborn Circle, 67226
John Lundblade, 260 N. Rock Road, Suite 250, 67206
Roger Wells, Rahenkamp Sachs Wells & Associates,
Stetson House, 1717 Spring Garden Street,
Philadelphia, Pennsylvania, 19130

City Manager's Agenda Item Page

RECOMMENDATION FROM METROPOLITAN AREA PLANNING COMMISSION TO BOARD OF CITY COMMISSIONERS

REQUEST FOR ZONING
AND APPROVAL OF RESIDENTIAL CUP

CASE NO. Z-1707 & DP-73 CONSIDERED BY MAPC: 6-12-75

REQUEST FOR: Change from "AA" and "LC" to "AA"
Approval of Residential Community Unit Plan

REASON FOR REQUEST (AS PROVIDED BY APPLICANT):
Development of a single and multi-family housing subdivision.

GENERAL LOCATION: Generally located between Woodlawn and Rock Road and between 29th and 21st Streets North

LEGAL DESCRIPTION:

See attached excerpt from Planning Commission minutes of June 12, 1975.

APPLICANT: Wichita Land Company, 2500 Claiborn Circle 67226

COUNSEL FOR APPLICANT: Howard West, Agent

PROTESTORS (LIST COUNSEL) IF ANY: None

SURROUNDING ZONING: To the north is "AA" and "LC"; east is "AA", "LC" and "R-1"; south is "R-5" and "LC"; west is "AA", "BB" and "LC"

LAND USE: Subject property and that to the north, east, and south is undeveloped and agricultural; west is single-family, multi-family, office and undeveloped

PLANNING COMMISSION RECOMMENDATION:

That Z-1707 be approved, and the associated DP-73 be approved subject to conditions a. through i. as shown in the staff report (see attached excerpt from Planning Commission minutes of June 12, 1975 for conditions), and also subject to changing the platting time from one year to three years, amending the minimum lot area for single-family homes to 6,000 square feet, and clarifying the responsibility for maintenance of the various openspace areas. Rising moved, Savina seconded and it carried unanimously. Gardenhire, Bayouth and Hopper were absent.

ACTION 1. Approve the zone change and CUP as recommended by the Metropolitan Area Planning Commission, subject to the recommended conditions, and instruct the Planning Department to forward the ordinance for first reading when the plat is forwarded to the City Commission; or

2. Return the applications to the Metropolitan Area Planning Commission for its reconsideration. The City Commission states the following reasons for its action:

EXCERPT FROM PLANNING COMMISSION MINUTES OF JUNE 12, 1975:

23a. Case No. Z-1707 - Wichita Land Company requests change from "AA" and "LC" to "AA" for:

All that part of Sec. 6, Twp. 27S, R2E of the 6th P.M., Sedgwick County, Kansas, described as follows:

Beg. at the SE corner of 29th St. No. and Woodlawn Blvd.; thence southerly, along the E. line of Woodlawn Blvd.; to the N line of Hinkle's Add.; thence easterly, along the N line of Hinkle's ADd., to the NE corner thereof; thence southerly, along the E line of Hinkle's Add., to the S line of the NW 1/4 of said Sec. 6; thence easterly, along said S line, to the SE corner of said NW 1/4; thence southerly, along the W line of the SE 1/4 of said Sec. 6, to the N line of 21st St. No.; thence easterly, along said N line, to the W line of Rock Rd.; thence northerly, along said W line, to the S line of the NE 1/4 of said Sec. 6; thence westerly, along said S line to the se corner of the east 1/2 of said NE 1/4; thence northerly, along the W line of said E 1/2, to the S line of 29th St. North; thence westerly, along said S line to a point 1684.70 ft. E of the W line of said Sec. 6; thence southerly, parallel with the west line of said Sec. 6, a distance of 879.38 ft.; thence northwesterly 566.41 ft. to a point 1139.70 ft. E and 751.76 ft. S of the NW corner of said Sec. 6; thence northerly, parallel with the west line of said Sec. 6 a distance of 721.76 ft., to the S line of 29th St. No.; thence westerly, along said south line to the point of beginning. Generally located between Woodlawn and Rock Rd. and between 29th and 21st Sts. North.

23b. Case No. DP-73 - Wichita Land Company requests approval of a Residential Community Unit Plan for: (See legal description above for Case No. Z-1707).

GALBRAITH pointed out the area on the map and reviewed the following staff report:

Comments

1. As permitted under the Residential CUP provisions of the zoning ordinance, the applicant has submitted a preliminary residential development plan for review and recommendation by the Planning Commission. In order for the Planning Commission to recommend approval of a residential CUP, it must find specific evidence and facts showing that the proposed development plan meets the following conditions:

   a. That the value of the buildings and the character of the property adjoining the area included in such plan will not be adversely affected.

   b. That such plan is consistent with the intent and purpose of this Chapter (28.04.190.A.) to promote public health, safety, morals and general welfare.

   c. That the buildings shall be used only for residential purposes and the usual accessory uses, such as automobile parking areas, garages and community activities, including churches; and provided that an "LC" district can be established through the regular channels.

   d. That the average lot area per family contained in this site, exclusive of the area occupied by streets, shall be not less than the lot area per family required by the district in which the development is located.

2. This application represents phase two of the Comotara Residential development and encompasses the three quarter-sections adjoining Phase I presently under construction. The plan proposes a residential development of townhouses, garden

apartments, and single and two family units, the number of which will not exceed 5.6 dwelling units per net acre, or a total of 1,654 DU's for the entire tract. The applicants have also requested that those portions of subject property which are presently zoned the "LC" Light Commercial District be changed to the "AA" single-family district inasmuch as the requested densities can be developed under "AA" single-family zoning. It should be noted that although the applicant has depicted both an elementary and senior high school site on the CUP for reference purposes, neither site is contained within the plan itself.

3. During the early discussions with the applicant's consultants, the primary issue has been the applicant's proposal to modify street and drainage standards as contained within the Subdivision Regulations that are presently required of developers in the City of Wichita. The Subdivision Regulations require all urban streets to be constructed with curb and gutter, that collector streets be constructed with 40 feet of paving to accommodate two 12-foot moving and two parking lanes; and that residential streets be constructed with 34 feet of paving for two 9-foot moving lanes and two parking lanes.

The applicants are proposing that no on-street parking be permitted on collector streets and that they be constructed as non curb and gutter sections with two 12-foot moving lanes, two 4-foot shoulders and that drainage be handled in open ditches (swales) by means of adjacent drainage easements rather than on public street dedications. Also proposed for residential streets (both loop and cul-de-sacs) are two moving lanes and parking permitted on one side only in 30 feet of paving.

Section 7-207 of the Subdivision Regulations permits the Planning Commission to approve planned unit developments which do not contain standard street, lot, and subdivision arrangements, provided that the departure from the standards of the regulations can be made without destroying the intent of the regulations. After several meetings with representatives of the applicants, the Director of Planning and Director of Public Works, have tentatively agreed that some modifications of street and drainage standards might be appropriate because of the densities proposed, the arrangement of parcels, the fact that there are no single-family lots that have direct access to collectors and that there will be a guarantee of three off-street parking spaces for each single and two-family unit. City staffs have expressed concern for there still being a need for on-street parking, the fact that short cul-de-sacs will probably have very few on-street parking spaces and that there will be continued maintenance problems with drainage ditches (swales) rather than curb and gutter streets and enforcement problems of parking violations on streets designed for parking on only one side.

The applicants have now agreed on the face of the CUP to submit homeowners association agreements which provide for drainage maintenance and they have also modified the plan to provide that short cul-de-sacs will be designed to the present standard permitting two parking lanes.

Although there has been general agreement with this street and drainage concept, it cannot be over-emphasized that final determination of street right-of-way and pavement widths and necessary widths for drainage easements will be resolved at the time of platting.

4. Another concern of the staff has been the designation of
2. "privately owned deed restricted open space" proposed by the applicants for areas such as indicated on Parcels 10, 13 and 14. The intention appears to be to sell rather deep lots to individual homeowners with certain portions of the lots to be considered "open space" protected by restrictive covenants

in order to preserve existing hedgerows and future landscaped area, including berms. The staff's initial position is that such common open space should be maintained in a uniform fashion by the homeowners association rather than having individual owner develop his own style of maintenance or non maintenance.

There is also confusion as to who is responsible for the maintenance and who benefits from all the open space areas, including Parcel 17. General Provision #9 sets out provisions for the maintenance of two of the open space areas. However, it is not clear if all owners of property within the CUP have the right to use open space areas under 9a that are privately owned by the multiple family owners of a given parcel. The applicant should be prepared to describe the open space areas and who is responsible for maintenance and also who has the right to use these areas. An explanation would also be helpful on who is responsible for Parcels 16 and 17.

5. It is also suggested that the existing silo sign referred to in General Provision #11 can be accommodated through approval of the CUP by the Planning Commission and Board of City Commissioners and no Board of Zoning Appeals action is required. However, the maintenance of the sign should be covered by the homeowners agreement.

6. Should the Planning Commission determine that a change of zoning is appropriate and find that the four conditions listed in comment #1 have been satisfied, the following are recommended conditions of approval:

   a. Platting of subject property within one year from the date of approval by the City Commission; or the applications be considered denied and closed.

   b. The transfer of title of all or any portion of the land included within the Community Unit Plan does not constitute a termination of the plan or any portion thereof, but said plan shall run with the land for residential development and be binding upon the present owners, their successors and assigns, unless amended.

   c. The development of this property proceeding in accordance with the development plan as approved by the Planning Commission, and any substantial deviation of the plan, as determined by the Superintendent of Central Inspection and the Director of Planning, shall constitute a violation of the building permit authorizing construction of the proposed development.

   d. Any major changes in this development plan being resubmitted to the Planning Commission and City Commission for their consideration.

   e. A sidewalk plan depicting the location of all private walks and sidewalks adjacent to public streets shall be submitted for approval at the time of platting.

   f. General Provision #7 should be expanded to provide assurance of maintenance for all designated open space areas, parking areas, community facilities, drainage channels and swales, and silo, silo signs and logos. Assurance of maintenance must be provided for all open space areas.

   g. The phrase "if variance is granted by Board of Zoning Appeals" shall be deleted from General Provision #13.

   h. General Provision #2 shall be expanded to include a net acre figure for the entire development in addition to the gross acre figure already listed.

   i. The text shall be amended to reflect that subject property is located in Range 2 East rather than Range 1 East.

GALBRAITH said that there were mixed feelings on the proposed reduction of street standards especially for the open ditches adjacent to the proposed collectors rather than the standard curb and gutter section, however, the staff had indicated a willingness to review the street sections proposed at the time of platting. He said it is unknown how much right-of-way will be needed adjacent to the collector streets to accommodate an open swale. He said it appears that open space is even more than the indicated 27%, and he recommended that the platting time be three years from the date of approval.

HENNESSY expressed concern for entrance to homes across the swale and GALBRAITH pointed out that there would be no individual single-family homes that would have a driveway across the swale to a collector street, but that there would be driveways for multi-family townhouses and garden apartments.

HENNESSY wondered if this might be setting a precedent so far as variation of the Subdivision Regulations. GALBRAITH said the regulations do permit a deviation to the standards, but that it is only appropriate on large tract acreage developments where some control is assured by a homeowners association agreement. He said Public Works staff generally does not think open ditches (swales) are desirable as there is a potential maintenance problem.

GALBRAITH said that as approved on the original phase of Comotara, there is a mixture of public and private sidewalks, some in open space areas and some on public streets, and an overall sidewalk plan will be submitted at the time of platting.

RISING asked if the Commission could require maintenance of the open space by the developer, and let the individual owners be responsible to the developer for such maintenance. LAKIN said it is likely that there would be several homeowners associations formed and responsibilities so far as maintenance of open space divided, but overall maintenance would be handled by one overall association. He explained further that as in any homeowners association so far as open space maintenance, the public would have the right of maintenance if neglected by the homeowners association and then costs would be charged back to the property. He said this is a standard provision in such agreements.

LAKIN pointed out further that this would be a deviation of the normal regulations, but that it is possible under the Subdivision Regulations where applicable to a large area being developed, but if someone wanted such deviation on 10 or 20 acres and without the ability to assure continued development of a total system, it would likely not be favorably considered.

With respect to street widths proposed, LAKIN said it is a different approach to the same standards, in that there would be the appropriate size moving lanes for the type of traffic volume and speed expected, but it would really be the elimination of constructing streets for parking rather than for the more functional and purpose of moving traffic. He suggested that it is quite expensive parking to provide 6 inches of concrete when such parking could be provided on driveways at a lesser standard.

RISING asked if there was a minimum acreage specified in the regulations for the type of standards proposed in this case. LAKIN said there is not, but that it would have to be large enough to deal with, that a quarter section of land could probably qualify.

HENNESSY asked how this standard compared with Crestview development and LAKIN answered that he thought the requirements were higher, because Crestview has two off-street spaces per lot but curbed and guttered streets.

SAVINA asked if the type of paving is specified. LAKIN responded that it is not specified as far as the staff is concerned, and that the developer can petition the city for either the concrete or to asphalt standard.

HOWARD WEST, general manager of Comotara, stated that one of the main reasons they have brought in a new design innovation is an attempt to control and reduce costs and special assessments. He reported that in the sales made thus far in the first addition, they have experienced a growing reluctance on the part of buyers with regard to specials. What they have proposed in this instance, he thought, is one way to reduce total housing costs and make better housing available to more people. In addition, the fees for association memberships will be reduced as they do enter into the ability to buy a suitable home in many cases, and they have tried to take both into consideration.

With regard to the first addition to Comotara, WEST said that of the first 136 lots platted, 124 have been sold to builders and there are now 49 houses either completed or under construction, so approval of this CUP is very important in order for them to maintain a continuing inventory of lots for development.

WEST also asked that the time for platting be extended to five years in view of the size of the property, although they have confidence that their development will move fast.

JOHN LUNDBLADE pointed out that on the face of the CUP it proposes that the minimum lot size would be 8,500 square feet, and he asked that this be corrected to reflect a minimum size of 6,000 square feet. He stated that it is their plan to have some smaller lots for smaller homes in the area. LUNDBLADE pointed out also that a great deal of time and planning has been devoted to this project and that when developed it will be one that they will be very proud of.

ROGER WELLS, on behalf of the applicant, referred to the concern of some as to who is going to maintain the open space, especially that associated with the area proposed for single-family use. From a planning standpoint, he felt there were certain lots which ought to be larger, especially those backing up to major streets, and through the use of setback lines or through a homeowners association agreement they can be larger and still maintained. For instance, along Rock Road it is important that houses be kept back, and they have provided for an area which could be termed open space but actually the lots are only larger and thus buffered from the street. WELLS said they plan to protect some of the existing hedge rows and that as a member of the association, any buyer of such a lot would have to agree to maintain such hedge row to the standards set by the association.

Further on the open space, WELLS noted that there are two types, one winding its way through the single-family area and it is mentioned in the CUP as being 19 acres. This would relate primarily to the single-family houses which would have direct access or abut the area, and maintenance of the open space will be covered in the homeowners association agreement covering the single-family areas. In this area also are two small ponds which residents of the single-family homes can enjoy and also maintain.

WELLS pointed out that the other open space is related to flood control and is adjacent to the proposed multiple family areas and will be enjoyed visually by everyone but will be primarily utilized by those people living adjacent in the specific parcel. He said that if a multi-family developer buys a piece of land, he is buying not only to build, but as well, an integral part of the open space to be maintained by him.

WELLS felt that in the last ten years there has been an over zealous approach in establishing open space for people to take care of, which is costly and should be more directly shared by those on the open space. He said that what they have proposed in this case has been shown to work quite successfully in many areas, and he as a planner thought it was the right thing to do in trying to provide housing without excessive burden to the buyer.

GALBRAITH said he did not disagree with the statements made on the maintenance of open space, but he did not think it was clear on the CUP, and suggested rewording to avoid any possible misunderstand-

ing later on, if this concept is to be approved. He asked if all open space areas would be available for use by all the property owners, and WELLS answered that there would be private sidewalks for use by all.

GALBRAITH asked if all residents would have the right to enjoy the open space or just the right to walk on the sidewalk. WELLS replied that technically it would only be the right to use the sidewalk.

GALBRAITH asked if there would be a homeowners association agreement for each parcel proposed for multiple family uses, and WELLS said there would not necessarily be one, but that there could be. He continued that the constant layering of agreements is difficult to administer. He said they are trying to establish a simple system through modification of the standards to result in a straight forward way of handling open space. In further discussion of open space maintenance, WELLS indicated that failure to maintain the space could result in a lien against indiviudal properties, but that the maintenance of the lakes would be covered in a homeowners association agreement. He said that in the single-family area, a buyer must become a member of the association.

In connection with the collector streets and swales thereon, LAKIN said that the Public Works Department had suggested that maintenance be the responsibility of the abutting property owners to maintain either individually or through an association. WELLS said it would be the responsibility of individual owners for maintenance of the swales except where it crosses a road. WELLS pointed out that they have conferred with the various city departments several times to develop proof to show that in all good faith what is suggested is reasonable. He stated that, based on engineering facts and figures, in all probability it should work as well as the normal method and that it is not a destruction of the Subdivision Regulations.

GRAGG asked how much the developer felt was saved so far as costs. WELLS said it would depend on the type of lot and location, in that streets are not all the same width, some have curb and gutter and some have swales adjacent to the collector streets.

HENNESSY expressed some concern as to whether or not the ponds proposed and swales would adequately handle any flooding situation which might arise.

WELLS referred back to the question of savings, and reported that on a collector street it is estimated there would be a reduction in cost from $46 per foot to $33 per foot and maintenance costs would be reduced from $5.10 per lineal foot to $4.70.

GALBRAITH said that the Maintenance Division of Public Works is concerned for the proper maintenance of the swales, and that such maintenance would be assured by some type of homeowners association, but apparently that is not to be the case, and so for proper maintenance the city might have to go to each complex or single-family home to see that such maintenance is properly done.

WEST spoke again to explain that the individual homeowner will be responsible for the swale adjacent to his property, but if he doesn't maintain it, then the association will take care of it and the asosciation will assess the cost to the property.

As for the request for a minimum lot size of 6,000 square feet, GALBRAITH said he would not disagree with that request as long as the number of single-family lots is not increased. He still recommended only three years platting time and allowance of extensions if necessary, rather than the five year period as requested.

GRAGG was concerned that if swales are allowed in this case, it would lead to numerous other such requests by other developers.

LAKIN indicated that swales should only be used in development of considerable land and that it would be a matter of being able to guarantee performance. He stated that it apparently has worked in other parts of the country,but that there are pros and cons, and there is a situation of a similar nature in Eastborough and Benjamin Hills areas.

No one appeared in opposition.

MOTION: That the Planning Commission recommend to the City Commission that Z-1707 be approved, and the associated DP-73 be approved subject to a. through i. as shown in the staff report, and also subject to changing the platting time from one year to three years, amending the minimum lot area for single-family homes to 6,000 square feet, and clarifying the responsibility for maintenance of the various open space areas. Rising moved, Savina seconded andit carried unanimously. Gardenhire, Bayouth and Hopper were absent.

ARCHITECTS - ENGINEERS
VAN DOREN - HAZARD - STALLINGS
250 ROCKBOROUGH BUILDING, 260 NORTH ROCK ROAD WICHITA, KANSAS 67206
TELEPHONE 316 686-7303

June 23, 1975

Re: Comotara Community Unit Plan
Our Job No. 4-74-008

Wichita-Sedgwick County
Metropolitan Area Planning Dept.
City Building Annex
104 South Main
Wichita, Kansas 67202

Attn: Mr. Jack Galbraith

Dear Mr. Galbraith:

As requested by your letter dated June 13, 1975, we are forwarding nine corrected copies of the Comotara C.U.P.

Very truly yours,
John E. Lundblade
John E. Lundblade

cc: Wichita Land Co.

June 13, 1975

Mr. Howard West, General Manager
Wichita Land Company
2500 Clairborn Circle
Wichita, Kansas 67226

Re: Z-1707 - "AA" and "LC" to "AA"; and DP-73 Residential CUP - Between Woodlawn and Rock Road and between 21st and 29th Streets North

Dear Mr. West:

At the regular meeting of the Metropolitan Area Planning Commission on June 12, 1975, the above-captioned cases were considered. It was the action of the Commission to recommend the approval of the zone change request and the associated Community Unit Plan subject to conditions a. through i. as shown in the Planning Department report, and also subject to changing the platting time from one year to three years, amending the minimum lot area for single-family homes to 6,000 square feet, and clarifying the responsibility for maintenance of the various open space areas.

The necessary corrections and clarification should be made on the CUP and nine corrected copies submitted to our office by June 25, 1975, so that these cases can be forwarded on to the Board of City Commissioners for consideration on July 1, 1975, the meeting to start at 9:00 a.m. in Room 201 City Building, 204 South Main, Wichita, Kansas.

If you have any questions, please call.

Sincerely,

Jack H. Galbraith
Chief Planner

JHG:ber
cc: Van Doren-Hazard-Stallings, 260 N. Rock Road, Suite 250 67206
Wichita Land Company, 2500 Clairborn Circle 67226
John Lundblade, 260 N. Rock Road, Suite 250 67206
Royer Wells, Rahenkamp Sachs Wells & Associates
Stetson House, 1717 Spring Garden Street
Philadelphia, Pennsylvania 19130
City Manager's Office

WICHITA-SEDGWICK COUNTY
METROPOLITAN AREA PLANNING DEPARTMENT

MAPC HEARING DATE: June 12, 1975

Case No. Z-1707 Case No. DP-73	Request: "AA" and "LC" to "AA" Residential CUP

Location: Between Woodlawn and Rock Road and between 21st and 29th Streets North

Reason: "Development of single and multi-family housing."

Acres; 340	Size: 3905 ft. by 5327 ft. Irregular

	Land Use	Zoning
Existing	Undeveloped, agriculture	"AA" & "LC"
North	Undeveloped, agriculture	"AA" & "LC"
East	Undeveloped, agriculture	"AA", "LC" & "R-1"
South	Undeveloped, agriculture	"R-5" & "LC"
West	Single-family, multi-family, office & undeveloped	"AA", "BB" & "LC"

Adequate street right-of-way shall be dedicated at time of platting. History: SCZ-0290 - "C" & "LC" to "R-1" 8-10-72 MAPC approved 8-23-72 B.Co.C. Approved	Platted: No Sidewalk: None

Comments

1. As permitted under the Residential CUP provisions of the zoning ordinance, the applicant has submitted a preliminary residential development plan for review and recommendation by the Planning Commission. In order for the Planning Commission to recommend approval of a residential CUP, it must find specific evidence and facts showing that the proposed development plan meets the following conditions:

   a. That the value of the buildings and the character of the property adjoining the area included in such plan will not be adversely affected.

   b. That such plan is consistent with the intent and purpose of this Chapter (28.04.190.A.) to promote public health, safety, morals and general welfare.

   c. That the buildings shall be used only for residential purposes and the usual accessory uses, such as automobile parking areas, garages and community activities, includ-

ing churches; and provided that an "LC" district can be established through the regular channels.

d. That the average lot area per family contained in this site, exclusive of the area occupied by streets, shall be not less than the lot area per family required by the district in which the development is located.

2. This application represents phase two of the Comotara Residential development and encompasses the three quarter sections adjoining Phase I presently under construction. The plan proposes a residential development of townhouses, garden apartments, and single and two family units, the number of which will not exceed 5.6 dwelling units per net acre, or a total of 1,654 DU's for the entire tract. The applicants have also requested that those portions of subject property which are presently zoned the "LC" Light Commercial District be changed to the "AA" single-family district inasmuch as the requested densities can be developed under "AA" single-family zoning. It should be noted that although the applicant has depicted both an elementary and senior high school site on the CUP for reference purposes, neither site is contained within the plat itself.

3. During the early discussions with the applicant's consultants, the primary issue has been the applicant's proposal to modify street and drainage standards as contained within the Subdivision Regulations that are presently required of developers in the City of Wichita. The Subdivision Regulations require all urban streets to be constructed with curb and gutter, that collector streets be constructed with 40 feet of paving to accommodate two 12-foot moving and two parking lanes; and that residential streets be constructed with 34 feet of paving for two 9-foot moving lanes and two parking lanes.

The applicants are proposing that no on-street parking be permitted on collector streets and that they be constructed as non curb and gutter sections with two 12-foot moving lanes, two 4-foot shoulders and that drainage be handled in open ditches (swales) by means of adjacent drainage easements rather than on public street dedications. Also proposed for residential streets (both loop and cul-de-sacs) are two moving lanes and parking permitted on one side only in 30 feet of paving.

Section 7-207 of the Subdivision Regulations permits the Planning Commission to approve planned unit developments which do not contain standard street, lot, and subdivision arrangements, provided that the departure from the standards of the regulations can be made without destroying the intent of the regulations. After several meetings with representatives of the applicants, the Director of Planning and Director of Public Works, have tentatively agreed that some modifications of street and drainage standards might be appropriate because of the densities proposed, the arrangement of parcels, the fact that there are no single-family lots that have direct access to collectors and that there will be a guarantee of three off-street parking spaces for each single and two-family

unit. City staff have expressed concern for there still being a need for on-street parking, the fact that short cul-de-sacs will probably have very few on-street parking spaces and that there will be continued maintenance problems with drainage ditches (swales) rather than curb and gutter streets and enforcement problems of parking violations on streets designed for parking on only one side.

The applicants have now agreed on the face of the CUP to submit homeowners association agreements which provide for drainage maintenance and they have also modified the plan to provide that short cul-de-sacs will be designed to the present standard permitting two parking lanes.

Although there has been general agreement with this street [illegible] and drainage concept, it cannot be over-emphasized that final determination of street right-of-way and pavement widths and necessary widths for drainage easements will be resolved at the time of platting.

4. Another concern of the staff has been the designation of "privately owned deed restricted open space" proposed by the applicants for areas such as indicated on Parcels 10, 13 and 14. The intention appears to be to sell rather deep lots to individual homeowners with certain portions of the lots to be considered "open space" protected by restrictive covenants in order to preserve existing hedgerows and future landscaped area, including berms. The staff's initial position is that such common open space should be maintained in a uniform fashion by the homeowners association rather than having individual owner develop his own style of maintenance or non maintenance.

   There is also confusion as to who is responsible for the maintenance and who benefits from all the open space areas, including Parcel 17. General Provision #9 sets out provisions for the maintenance of two of the open space areas. However, it is not clear if all owners of property within the CUP have the right to use open space areas under 9a that are privately owned by the multiple family owners of a given parcel. The applicant should be prepared to describe the open space areas and who is responsible for maintenance and also who has the right to use these areas. An explanation would also be helpful on who is responsible for Parcels 16 and 17.

5. It is also suggested that the existing silo sign referred to in General Provision #11 can be accommodated through approval of the CUP by the Planning Commission and Board of City Commissioners and no Board of Zoning Appeals action is required. However, the maintenance of the sign should be covered by the homeowners agreement.

6. Should the Planning Commission determine that a change of zoning is appropriate and find that the four conditions listed in comment #1 have been satisfied, the following are recommended conditions of approval:

a. Platting of subject property within one year from the date of approval by the City Commission; or the applications be considered lapsed and closed.

b. The transfer of title of all or any portion of the land included within the Community Unit Plan does not constitute a termination of the plan or any portion thereof, but said plan shall run with the land for residential development and be binding upon the present owners, their successors and assigns, unless amended.

c. The development of this property proceeding in accordance with the development plan as approved by the Planning Commission, and any substantial deviation of the plan, as determined by the Superintendent of Central Inspection and the Director of Planning, shall constitute a violation of the building permit authorizing construction of the proposed development.

d. Any major changes in this development plan being resubmitted to the Planning Commission and City Commission for their consideration.

e. A sidewalk plan depicting the location of all private walks and sidewalks adjacent to public streets shall be submitted for approval at the time of platting.

f. General Provision #7 should be expanded to provide assurance of maintenance for all designated open space areas, parking areas, community facilities, drainage channels and swales, and silo, silo signs and logos. Assurance of maintenance must be provided for all open space areas.

g. The phrase "if variance is granted by Board of Zoning Appeals" shall be deleted from General Provision #13.

h. General Provision #2 shall be expanded to include a net acre figure for the entire development in addition to the gross acre figure already listed.

i. The text shall be amended to reflect that subject property is located in Range 2 East rather than Range 1 East.

WICHITA-SEDGWICK COUNTY

METROPOLITAN AREA PLANNING DEPARTMENT

DATE

April 30, 1975

TO Ray Bruggeman, Director of Public Works
Dick Linn, City Engineer
Paul Graves, Traffic Engineer
George Wilton, Supt. of Public Works Maint.
M. S. Mitchell, Maint. and Flood Control Supervisor

FROM: Jack H. Galbraith, Chief Planner

SUBJECT: Comotara Community Unit Plan DP-73 and Zone Case Z-1707 - Zone Change from "AA" and "LC" to "LC". Generally located between Woodlawn and Rock Road and between 21st & 29th St. North

Yesterday we officially received an application for a residential community unit plan for Comotara. Accompanying the application was a six-sheet CUP and Recommended CUP Design Standards that have been revised since our last joint meeting with their consultants. A copy of each is attached for your information and review.

Although we have only briefly reviewed these sheets, I see numerous inconsistencies and major issues that need attention. You will recall the discussion on parking on one side of loop and collector streets provided there is off-street parking guarantees of three spaces per unit. Particularly note the sheet on parking and sidewalks where there is possibly one on street parking space for seven lots; three or four on-street spaces for twenty duplex units where there is assurance for only two off-street parking spaces per unit; four on-street spaces for twelve and thirteen lots, etc.

Another issue that may be of more concern to us is the computations on the front sheet of net buildable area which includes all public street rights-of-way. In other words, the computation of density that appears to be low is calculated for areas including street rights-of-way. Setbacks adjacent to collectors also need your attention. Please note that on all lots from collectors there is a 25-foot setback. However, for the most part, these are corner lots with required setbacks from adjacent side streets and it appears there is little buildable area left. The reason for the 25-foot setback from

collectors is the developers anticipate that a portion of that setback area will be required for utilities and sidewalk easements adjacent to the collector right-of-way of seventy feet. I have not given any attention to the sheet on drainage and would appreciate your detailed review.

I would appreciate any comments you have by May 9, 1975 so that we can respond to the applicant and, hopefully, advertise these cases for the Planning Commission meeting of June 12, 1975.

If a general review session on this material is required, please advise.

Jack H. Galbraith
Chief Planner

JHG:js

Attachment

DP-73 - 22 NOTICES TO ADJACENT PROPERTY OWNERS MAILED 5-29-75 for MAPC 6-12-75

WICHITA-SEDGWICK COUNTY
METROPOLITAN AREA PLANNING COMMISSION
CITY BUILDING ANNEX, 104 South Main
WICHITA, KANSAS 67202

May 28, 1975

NOTICE TO ADJOINING PROPERTY OWNERS:

The Wichita-Sedgwick County Metropolitan Area Planning Commission will consider an application for a COMMUNITY UNIT PLAN - PLANNED RESIDENTIAL DEVELOPMENT, "Phase 2 of Comotara" - in Room 401 City Building Annex, 104 South Main, Wichita, Kansas, at its meeting beginning at 1:30 p.m. on June 12, 1975, at which time you may appear either in person or by agent or attorney, if you so desire.

DP-73 - All that part of Sec. 6, Twp. 27S, R2E of the 6th P.M., Sedgwick County, Kansas, described as follows:

Beginning at the SE corner of 29th St. North and Woodlawn Blvd.; thence southerly, along the east line of Woodlawn Blvd., to the north line of Hinkle's Add.; thence easterly, along the north line of Hinkle's Add.! to the NE corner thereof; thence southerly along the east line of Hinkle's Add., to the south line of the NW ¼ of said Sec. 6; thence easterly, along said south line to the SE corner of said NW ¼; thence southerly, along the west line of the SE ¼ of said Sec. 6, to the north line of 21st St. No.; thence easterly, along said north line, to the west line of Rock Rd., thence northerly, along said west line, to the south line of the NE ¼ of said Sec. 6; thence westerly, along said south line, to the SE corner of the east ½ of said NE ¼; thence northerly, along the west line of said east ½, to the south line of 29th St. North; thence westerly, along said south line to a point 1684.70 ft. east of the west line of said Sec. 6, thence southerly, parallel with the west line of said Sec. 6, a distance of 879.38 ft.; thence northwesterly 566.41 ft. to a point 1139.70 ft. east and 751.76 ft. south of the NW corner of said Sec. 6; thence northerly, parallel with the west line of said Sec. 6 a distance of 721.76 ft., to the south line of 29th St. North; thence westerly, along said south line, to the point of beginning. Generally located between Rock Road and Woodlawn and between 21st St. and 29th St. North.

The Development Plan of this area has been submitted as provided for under the Community Unit Plan provisions of Section 28.04.190 of the City Zoning Ordinance of the City of Wichita. The Development Plan is on file in the Planning Department Office, Room 402 City Building Annex 104 South Main, Wichita, Kansas, and is available for public information and review.

The Development Plan on file proposes an approximate 340 acre single and two family, townhouse and garden apartment development, the density of which will not exceed 5.6 dwelling units per acre or a total of 1,654 dwelling units for the entire site. In addition to indicating the lots for single and two family residences and the proposed building locations for townhouses and garden apartments, the Development Plan indicates information on maximum building coverage, maximum building heights, setbacks for structures, proposed usable open space, means of ingress and egress in and through the area, interior circulation and proposed parking ratio.

NOTE: It is the policy of the Planning Commission that any request for a deferral of the hearing of this case shall be submitted to the Secretary, Robert A. Lakin, 104 South Main, 7 days prior to the meeting. The Chairman or the Secretary may grant such a request for deferral. Persons requesting deferrals will be charged with the cost of preparing and mailing new notices.

Robert A. Lakin
Secretary

Talked with Ken Sterling on detail about these conditions on 5/7/75 HO

COMOTARA

1. PARCEL DENSITIES - have been calculated on net developable area for multifamily but a gross figure is used in calculation of Single Family area. The Planning Commission is required to certify under Section 28.04-190.4 that the average lot per family contained in the site, exclusive of the area occupied by streets shall not be less than the lot area/family required for the district in which development is located -- impossible to certify if gross densities are used. A short discussion to clarify the terms "gross area" and "net area" might be in order.

2. There is a substantial amount of "deed restricted" open space contained in Single Family Parcels even though the text indicates that "common open space" is normally associated with the Single Family parcels. Although we concur that the hedgerows should be preserved, why can't these areas be common open space?

3. The allowance of only one parking lane on the loop streets was based on assurances that a minimum of three offstreet parking spaces would be provided but parcel 9 & 14 (Single Family) depicts only 2 and parcel 13 omits parking ratio altogether. The sidewalk and parking Plan(F4) depicts as many as 6 duplex lots to be served by a maximum of two on-street parking spaces!

4. The term "multi-family" as a land use is nebulous. The proposed uses should be changed to garden apartments, townhouses, patio-homes, etc. There is a distinct difference in traffic generation rates between these housing types and we would like to

see which types are proposed for different parcels.

5. The primary CUP document shows no proposed design for parcel one and would allow one curb cut for 31 acres while sheet F-4 indicates a design for parcel one with 2 curb cuts to Woodlawn. Which is correct?

6. Parcel nine contains 13 lots grouped around a cul-de-sac on the primary CUP but on subsequent sheets (F-1 through F-5), parcel nine is designed as 14 lots served by a loop street. Which is correct?

7. Mainsgate road has a slightly different alignment on the primary CUP sheet and subsequent sheets. Which is correct?

8. The primary CUP sheet should contain a scale and north arrow.

9. There are two different parcels labeled 12 on the primary CUP. We assume one of these is actually parcel 16.

10. There is one parcel which contains no number. We assume it is parcel 11.

11. Statement seven in the text should be expanded to make it clear that the homeowners association is responsible for maintenance of the drainage swales adjacent to the collector streets.

12. The word "variance" should be deleted from text statement fourteen and replaced with the word "Adjustment". (Variances are granted by the Board of Zoning Appeals).

13. Statement twelve in the text calls for a minimum lot size of 8,500 square feet for detached Single Family. We would like to discuss this.

14. Parcels seven, ten, and fourteen depict different numbers of lots than the text would allow dwelling units.

15. Many of the single family lots depicted violate the subdivision regulations in that the length is more than 2 1/2 the width of the residential lot.

16. The text for parcel ten calls for duplex units , but on Map F-1 the "duplex symbol" is not used for parcel ten. Is parcel ten single-family attached or detached?

17. The sidewalk plan on F-4 does not appear to be compatable with the approved sidewalk plan for COMOTARA Phase I. We also question whether the proposed sidewalk plan adequately services parcel five.

18. Maps F-1 through F-5 appear to depict some form of large easement slashing diagionally accross parcel seven. What is this and how does it affect the proposed lot arrangement? Why is it not shown on the primary CUP page?

WICHITA-SEDGWICK COUNTY

METROPOLITAN AREA PLANNING DEPARTMENT

DATE April 30, 1975

TO Ray Bruggeman, Director of Public Works
Dick Linn, City Engineer
Paul Graves, Traffic Engineer
George Wilton, Supt. of Public Works Maint.
M. S. Mitchell, Maint. and Flood Control Supervisor

FROM: Jack H. Galbraith, Chief Planner

SUBJECT: Comotara Community Unit Plan DP-73 and Zone Case Z-1707 - Zone Change from "AA" and "LC" to "LC". Generally located between Woodlawn and Rock Road and between 21st & 29th St. North

Yesterday we officially received an application for a residential community unit plan for Comotara. Accompanying the application was a six-sheet CUP and Recommended CUP Design Standards that have been revised since our last joint meeting with their consultants. A copy of each is attached for your information and review.

Although we have only briefly reviewed these sheets, I see numerous inconsistencies and major issues that need attention. You will recall the discussion on parking on one side of loop and collector streets provided there is off-street parking guarantees ofthree spaces per unit. Particularly note the sheet on parking and sidewalks where there is possibly one on street parking space for seven lots; three or four on-street spaces for twenty duplex units where there is assurance for only two off-street parking spaces per unit; four on-street spaces for twelve and thirteen lots, etc.

Another issue that may be of more concern to us is the computations on the front sheet of net buildable area which includes all public street rights-of-way. In other words, the computation of density that appears to be low is calculated for areas including street rights-of-way. Setbacks adjacent to collectors also need your attention. Please note that on all lots from collectors there is a 25-foot setback. However, for the most part, these are corner lots with required setbacks from adjacent side streets and it appears there is little buildable area left. The reason for the 25-foot setback from

collectors is the developers anticipate that a portion of that setback area will be required for utilities and sidewalk easements adjacent to the collector right-of-way of seventy feet. I have not given any attention to the sheet on drainage and would appreciate your detailed review.

I would appreciate any comments you have by May 9, 1975 so that we can respond to the applicant and, hopefully, advertise these cases for the Planning Commission meeting of June 12, 1975.

If a general review session on this material is required, please advise.

Jack H. Galbraith
Chief Planner

JHG:js

Attachment

WICHITA-SEDGWICK COUNTY

METROPOLITAN AREA PLANNING DEPARTMENT

DATE
April 17, 1975

TO To the File

FROM Jack H. Galbraith, Chief Planner

SUBJECT Meeting with Comotara representatives to discuss issues raised in Dixon's April 2, 1975 letter

Those in Attendance:

Robert Lakin, R. L. Bruggeman, Dick Linn, George Wilton, M. S. Mitchell, Paul Graves, Bill McKinley, H. West, Robert Dixon, John Lundblade, Ken, and Jack Galbraith

Considerable time was spent discussing non-curb and gutter collector streets with drainage swales. Although Public Works was reluctant to see open swales used, there was finally agreement to try them adjacent to the collectors only where it is agreed that the Home Owners Association guarantees the construction, seeding and maintenance. This includes even a guarantee for single family homes.

Representatives of Comotara are confident the swales will work and would like Public Works figures and calculations to why they would not work.

Wilton was concerned and was not willing to support the swales. Ken maintained that a 4-1 slope was adequate to be maintained.

Location of street lighting was raised as a potential problem. Linn stated that there should be a follow-up with all utility company representatives to make sure where they will locate in regard to the swales.

70' right-of-way plus 15' easement on each side. Total is unknown until utility companies are satisfied. Wilton wants the 100 year flood in the street right of way.

In summary, Public Works was satisfied with collector-swale system in the SE ¼. Regarding the transition of the collector to 29th, there are to be no direct curb cuts from any single family to a collector. Transition details on concept R O 3 are to be worked out.

Sidewalks adjacent to property lines. Dead end sidewalks are to be eliminated, and are to be continued on to connect with other sidewalks.

Regarding road way dimensions on other streets, the minimum face to face is 24 feet, plus 15'of right of way from curb to property line.

R-7 35' turning radius for cul-de-sac. 100' - 70' surface.

Cul-de-sacs - 30' where parking is proposed. This is provided that there are three off-street parking spaces guaranteed for each single family residences documented on the CUP.

Jack H. Galbraith
Chief Planner

JHG:js

April 2, 1975

Mr. Jack Galbraith
Chief Planner
Community Development
City Building Annex
401 South Main Street
Wichita, Kansas 67202

Dear Jack:

We appreciated the time you took with us last Wednesday to discuss the Comotara project. I apologize for the early departure Ken and I had to make. I was anticipating a much broader and in-depth discussion of the city's processes and procedures as they apply to the relationship of a Community Unit Plan and subdivision regulations. However, the best laid plans of mice and men . . .

I would like to crystalize the various points that we have discussed with you, Bob, and various other departments and division heads in the city. I feel we are quite close to agreement on most points and can arrive at final conclusions that will be mutually satisfactory and equitable for all parties.

We see five major points that need to be resolved prior to or during the processing of the Community Unit Plan. In concise terms we see these points, which require modification to subdivision regulations, as follows:

1. Required cartway(s) of specifically identified streets and roads to be reduced from city standards. References: Section 7-201(G) of the City Subdivision Ordinance, pages 3-3 to 3-7 of the RSWA report.

2. Required rights-of-way of specifically identified streets and roads to be reduced from city standards. References: Section 7-201(G) of the City Subdivision Ordinance, pages 3-3 to 3-7 and Appendix Detail R-5 of the RSWA report.

Rahenkamp Sachs Wells and Associates, Inc.
Planners/Land Planners/Landscape Architects

Stetson House
1717 Spring Garden Street
Philadelphia, Pennsylvania 19130
(215) LO 8-7545

3. Provide one-side parking on streets that will directly serve residential areas that will and have been proposed to be reduced in rights-of-way and cartway width. References: Section 7-201(G) of the City Subdivision Ordinance, pages 3-3 to 3-7 of the RSWA report and Appendix Details R-5 and R-9.

4. Provide sidewalks on one side of culs-de-sac and loop streets and sidewalks along collectors, only where necessary for logical and continuous pedestrian links and substituting pedestrian/bicycle paths in the open space system. References: Section 8-103(B) of the City Subdivision Ordinance, pages 3-12 to 3-14 of the RSWA report and Appendix Details R-5 and R-9.

5. Substitute drainage swales for curb gutter and storm sewer along identified collector roads, storm sewer along residential loop roads, culs-de-sac and eyebrows, and increase the gradient of swales to insure proper drainage without scouring. References: Section 8-103(F) of the City Subdivision Ordinance, pages 3-18 to 3-26 of the RSWA report, and Appendix Details D-2, D-3, D-6, D-7, and D-9.

We will be looking forward to seeing you in two weeks or so to resolve these points. If there are any questions, please do not hesitate to contact us.

Cordially,

RAHENKAMP SACHS WELLS AND ASSOCIATES, INC.

Bob

Robert F. Dixon
Director, Public Planning

RFD:db

cc: H. West

ARCHITECTS - ENGINEERS
VAN DOREN - HAZARD - STALLINGS
250 ROCKBOROUGH BUILDING, 260 NORTH ROCK ROAD WICHITA, KANSAS 67206
TELEPHONE 316 686-7303

April 29, 1975

Re: Comotara Community Unit Plan
Our Job No. 4-74-008A0

Wichita-Sedgwick County Metropolitan
Area Planning Department
City Building Annex
104 South Main
Wichita, Kansas 67202

Attn: Jack Galbraith

Dear Mr. Galbraith:

Submitted herewith for your review are seven (7) copies of the Community Unit Plan for Comotara. In addition to the copies of the CUP, also included are:

1. Application for Community Unit Plan
2. Application for Zone Change
3. Wichita Land Company check for $470.00 to cover filing fees for Community Unit Plan and Zone Change.
4. Rahenkamp, Sachs & Wells background document.

If there are any questions please do not hesitate to call either my office or the offices of the Wichita Land Company.

Sincerely,

John E. Lundblade

JEL:et

cc: Howard R. West, Wichita Land Company
Rahenkamp, Sachs & Wells

APPLICATION FOR COMMUNITY UNIT PLAN
(PLANNED RESIDENTIAL OR COMMERCIAL DEVELOPMENT)
FOR PROPERTY LOCATED WITHIN THE LIMITS OF THE
CITY OF WICHITA, KANSAS

This is an application for a Community Unit Plan - Planned Development. The form must be completed and filed at the Planning Department, Room 402, City Building Annex, 104 South Main, Wichita, Kansas, in accordance with directions on the accompanying instruction sheet. AN INCOMPLETE APPLICATION CANNOT BE ACCEPTED.

I. Name of applicant or applicants and/or their agent or agents.

a. Applicant Wichita Land Company

Address 2500 Claiborn Circle, Wichita, KS 67226 Phone 686-7451

Agent Van Doren-Hazard-Stallings

Address 260 N. Rock Road, Wichita, KS 67206 Phone 686-7303

b. Applicant _____

Address _____ Phone _____

Agent _____

Address _____ Phone _____

c. Applicant _____

Address _____ Phone _____

Agent _____

Address _____ Phone _____

(Use separate sheet if necessary for names of additional applicants)

II.A The applicant hereby requests Community Unit Plan approval on property zoned "AA" and "LC" and legally described as Lot(s) _____, Block(s) _____, _____ Addition.

(If appropriate, metes and bounds description may be provided in the space below or on an attached sheet.)

See attached legal description.

II.B There are 339.9 acres (round to nearest tenth) in the above described property.

T9-330-3

III. This property is located at (address) _____.

The general location is (use appropriate section)

a. at the _____ corner of _____

and _____; or

b. on the East side of Woodlawn (Ave., Street) between 21st Street North (Ave., Street) and 29th Street North (Ave., Street).

IV. I (~~we~~), the applicant(~~s~~), acknowledge receipt of the instruction sheet explaining the method of submitting this application. I (~~we~~) realize that this application cannot be processed unless it is completely filled in and accompanied by a current abstractor's certificate as required in the instruction sheet.

_____

By _____
Authorized Agent (if any)

Wichita Land Company

By John E. Lundblade
Authorized Agent (if any)
John E. Lundblade
Van Doren-Hazard-Stallings

_____

By _____
Authorized Agent (if any)

_____

By _____
Authorized Agent (if any)

V. OFFICE USE ONLY

This application was received at the Planning Department at 1:45 (~~AM~~, PM) on April 29, 1975 (Day, Month, Year). It has been checked and found to be complete and accompanied by required documents and the appropriate fee of $ 400.

James H. Galbraith Name

Planning Planner Title

T9-330-4

Legal Description

COMOTARA

All that part of Section 6, Township 27 South, Range 1 East of the 6th P.M., Sedgwick County, Kansas, described as follows:

Beginning at the southeast corner of 29th Street North and Woodlawn Blvd.; thence southerly, along the east line of Woodlawn Blvd., to the north line of Hinkle's Addition; thence easterly, along the north line of Hinkle's Addition, to the northeast corner thereof; thence southerly, along the east line of Hinkle's Addition, to the south line of the northwest quarter of said Section 6; thence easterly, along said south line, to the southeast corner of said northwest quarter; thence southerly, along the west line of the southeast quarter of said Section 6, to the north line of 21st Street North; thence easterly, along said north line, to the west line of Rock Road; thence northerly, along said west line, to the south line of the northeast quarter of said Section 6; thence westerly, along said south line, to the southeast corner of the east one-half of said northeast quarter; thence northerly, along the west line of said east one-half, to the south line of 29th Street North; thence westerly, along said south line to a point 1684.70 feet east of the west line of said Section 6; thence southerly, parallel with the west line of said Section 6, a distance of 879.38 feet; thence northwesterly 566.41 feet to a point 1139.70 feet east and 751.76 feet south of the northwest corner of said Section 6; thence northerly, parallel with the west line of said Section 6 a distance of 721.76 feet, to the south line of 29th Street North; thence westerly, along said south line, to the point of beginning. Containing 339.9 acres, more or less.

FORM 223-021

PAYMENT NOTICE

City of Wichita

PAY AT TREASURER'S OFFICE - FIRST FLOOR

Bldg & Elev.	Elec.	Elev. Insp.	Exam. Fees
Hse. Mvr.	Hse. Moving	Licse.	Mech.
Oil Well	Pav. Cuts	Plan.	Plbg. Cert.
Sanitation	Sewer	Signs	Sidewalk
Street	Trailer		

DESCRIPTION	AMOUNT

Name

Address

Type	Due Date

Comments:

Date	By

OWNERSHIP LIST

Lot	Block	Addition	Property Owner
6	A	Comotara First Addition	Executive Residences Inc. c/o George McClellan 5301 N. Hydraulic 67219
7	A	Same	Same
8	A	Same	Same
9	A	Same	Same
10	A	Same	Same
11	A	Same	Same
12	A	Same	Wichita Land Company 2500 Claiborne Circle 67220
13	A	Same	Same
1	B	Same	R. O. Arnold & Son Inc. 6837 Sherica Circle 67209
2	B	Same	Executive Residences Inc. c/o George McClellan 5301 N. Hydraulic 67219
4	B	Same	Same
5	B	Same	Same
8	B	Same	Same
3	B	Same	SproulConstruction Co. 1940 N. Mt. Carmel 67203
6	B	Same	Same
7	B	Same	Clifford A. Nies & Betty J. 1825 S. Lorraine 67211
1	C	Same	Same
2	C	Same	Same
3	C	Same	Same
14	C	Same	Same
4	C	Same	Executive Residences c/o George McClellan 5301 N. Hydraulic 67219
5	C	Same	Same

Lot	Block	Addition	Property Owner
6	C	Comotara First Addition	Executive Residences Inc. c/o George McClellan I 5301 N. Hydraulic 67219
7	C	Same	Same
8	C	Same	Same
9	C	Same	Same
10	C	Same	Same
11	C	Same	Same
12	C	Same	Same
13	C	Same	Same
16	C	Same	Allen W. Denninger & Margaret C Address Unknown
17	C	Same	Wichita Land Company 2500 Claiborne Circle 67220
1	D	Same	Same
2	D	Same	Same
1	E	Same	Andrews-Wood Inc. 232 N. Seneca 67203
2	E	Same	Same
3	E	Same	Same
4	E	Same	Same
5	E	Same	Same
6	E	Same	Wichita Land Company 2500 Claiborne Circle 67220
7	E	Same	Same
8	E	Same	Same
9	E	Same	Same
10	E	Same	Same
11	E	Same	Randall H. Levin & Susan I. Address Unknown
12	E	Same	R. D. Rauscher & Shirley F. 1000 S. Woodlawn 67218
13	E	Same	Harold J. Pfountz & Judith M. Address Unknown

Lot	Block	Addition	Property Owner
14	E	Comotara First Addition	Richard L. Dreiling & Bob Jane 1000 S. Woodlawn 67218
15	E	Same	Sproul Construction Co. 1940 N. Mt. Carmel 67203
16	E	Same	Michael W. Dart & Sammie J. 844 S. Fountain 67218
1	F	Same	R. O. Arnold & Son Inc. 6837 Sheriac Circle 67209
2	F	Same	Same
3	F	Same	Same
5	F	Same	Same
4	F	Same	Ronald E. Van Huss & Lynne M. Address Unknown
1	G	Same	Wichita Land Company 2500 Claiborne Circle 67220
2	G	Same	Same
3	G	Same	Same
4	G	Same	Same
5	G	Same	Same
6	G	Same	Same
7	G	Same	Same
8	G	Same	Same
9	G	Same	Same
10	G	Same	Same
11	G	Same	R. O. Arnold & Son Inc. 6837 Sheriac Circle 67209
12	G	Same	Same
1	H	Same	Wichita Land Company 2500 Claiborne Circle 67220
2	H	Same	Same
3	H	Same	Same
4	H	Same	Same
5	H	Same	Same
6	H	Same	Same

Lot	Block	Addition	Property Owner
7	H	Comotara First Addition	Wichita Land Company 2500 Claiborne Circle 67220
8	H	Same	Same
9	H	Same	Same
10	H	Same	Same
1	I	Same	Same
2	I	Same	Same
3	I	Same	Same
4	I	Same	Same
5	I	Same	Same
5	I	Same	Same
6	I	Same	Same
7	I	Same	Same
8	I	Same	Same
9	I	Same	Same
10	I	Same	Same
11	I	Same	Same
12	I	Same	Same
13	I	Same	Same
3	J	Same	Same
4	J	Same	Same
5	J	Same	Same
6	J	Same	Same
7	J	Same	Same
8	J	Same	Same
9	J	Same	Same
10	J	Same	Same
11	J	Same	Same
12	J	Same	Same

Lot	Block	Addition	Property Owner
13	J	Comotara First Addition	Wichita Land Company 2500 Claiborne Circle 67220
14	J	Same	Same
15	J	Same	Same
16	J	Same	Same
17	J	Same	Same
18	J	Same	Same
11	K	Same	Same
12	K	Same	Same
13	K	Same	Same
14	K	Same	Same
15	K	Same	Same
16	K	Same	Same
17	K	Same	Same
18	K	Same	Same
19	K	Same	Same
20	K	Same	Same
1	L	Comotara Second Addition	Same
2	L	Same	Same
3	L	Same	Same
4	L	Same	Same
5	L	Same	Same
6	L	Same	Same
7	L	Same	Same
8	L	Same	Same
9	L	Same	Same
10	L	Same	Same
11	L	Same	Same
12	L	Same	Same
13	L	Same	Same

Lot	Block	Addition	Property Owner
14	L	Comotara Second Addition	Wichita Land Company 2500 Claiborne Circle 67220
15	L	Same	Same
16	L	Same	Same
17	L	Same	Same
18	L	Same	Same
Reserve I		Same	Same
Lot A except that portion conveyed to Country Lake, Inc.		Comotara First Addition	Same
All of Lots C, D, E & F	B,	Same	Same
Reserve A		Comotara First Addition	Same
Reserve B except that portion platted as Comotara Second Addition		Same	Same
All of Reserves C, D, E & F		Same	Same
Lot 1		Hinkle's Addition	Jack B. Hinkle, Trustee of Eva J. Hinkle Trust Union Center Bldg. 67202
1	1	E. E. Jabes Addition	E. E. Jabes R.F.D. #1, Derby Ks. 67037
2	1	Same	Same
4	1	Same	E. E. Jabes R.F.D. #L, Derby, Ks. 67037 Thomas M. Vickers 220 W. Douglas 67202
5	1	Same	Same
4	2	Same	Max L. Cole 3841 West 13th St. 67203
5	2	Same	E. E. Jabes R. F. D. #1, Derby, Kansas 67037 Thomas M. Vickers 220 W. Douglas 67202

Tract	Property Owner
The Northwest Quarter of the Northwest Quarter and the East Half of the Northwest Quarter of Section 6-27-2E	Wichita Land Company 2500 Claiborne Circle 67220
The Northeast Quarter of the Northeast Quarter of Section 6-27-2E	School District #259 428 S. Broadway 67202
The West Half of the Northeast Quarter of Section 6-27-2E	Wichita Land Company 2500 Claiborne Circle 67220
The Southeast Quarter of the Northeast Quarter of Section 6-27-2E	Board of Education 428 S. Broadway 67202
The Southeast Quarter of Section 6-27-2E	Wichita Land Company 2500 Claiborne Circle 67220
The West 1000 feet of the Southwest Quarter of Section 5-27-2E and the South Half of the Northwest Quarter Section 5-27-2E	Same
The Northeast Quarter of the Northwest Quarter of Section 7-27-2E	Theodore Gore Fourth National Bank Bldg.67202 Robert M. Beren Vickers K. S. B. & T BLDG.67202 Theodore I. Leben 1555 East 2nd Street 67214
The North Half of the Northwest Quarter of Section 8-27-2E	Louise W. Bradley 1800 N. Rock Road 67206
The East Half of the Northeast Quarter of Section 1-27-1E	Wichita Land Company 2500 Claiborne Circle 67220
The South Half of the Southeast Quarter of Section 36-26-1E except the West 550 feet of the South 970 feet	Board of Park Commissioners 204 South Main 67202

The Security Abstract & Title Company, Inc., hereby certifies the foregoing to be a true and correct list of property owners of:

A 1000 foot radius of: All that part of Section 6, Township 27 South, Range 2 East of the 6th P.M., Sedgwick County, Kansas described as: Beginning at the Southeast corner of 29th Street North and Woodlawn Blvd.; thence Southerly, along the East line of Woodlawn Blvd. to the North line of Hinkle's Additon; thence Easterly along the North line of Hinkle's Addition, to the Northeast corner thereof; thence Southerly, along the East line of Hinkle's Additon, to the South line of the Northwest Quarter of said Section 6; thence Easterly, along said South line, to the Southeast corner of said Northwest Quarter; thence Southerly, along the West line of the Southeast Quarter of said Section 6, to the North line of 21st Street North; thence Easterly, along said North line, to the West line of Rock Road; thence Northerly, along said West line, to the South line of the Northeast Quarter of said Section 6; thence Westerly, along said South line, to the Southwest corner of the East one-half of said Northeast Quarter; thence Northerly, along the West line of said East one-half, to the South line of 29th Street North; thence Westerly, along said South line to a point 1684.70 feet East of the West line of said Section 6; thence Southerly, parallel with the West line of said Section 6, a distance of 879.38 feet; thence Northwesterly 566.41 feet to a point 1139.70 feet East and 751.76 feet South of the Northwest corner of said Section 6; thence Northerly, parallel with the West line of said Section 6 a distance of 721.76 feet, to the South line of 29th Street North; thence Westerly, along said South line, to the point of beginning

as shown by the records on file in the Office of the Register of Deeds of Sedgwick County, Kansas, on this 16th day of May, 1975 at 7:00 A.M.

THE SECURITY ABSTRACT & TITLE COMPANY, INC.

By Mary Gable

Vice President

Order No. 224691
wh

*

This DP File
Has a Large Drawing
On 35mm Microfilm.
Roll #1

*

RECOMMENDED P.U.D. DESIGN STANDARDS

COMOTARA

OWNER:

WICHITA LAND COMPANY
2500 CLAIBORN CIRCLE
WICHITA, KANSAS 67226

LAND PLANNERS:

RAHENKAMP SACHS WELLS AND ASSOCIATES
1717 SPRING GARDEN STREET
PHILADELPHIA, PENNSYLVANIA 19130

DATE:

MARCH 1975

CONTENTS

COMOTARA

March 24, 1975

Wichita-Sedgwick County
Metropolitan Area Planning Commission
104 South Main Street
Wichita, Kansas 67202

Gentlemen:

We are pleased to submit for your review the Master Plan for Comotara, a proposed open space community for the City of Wichita.

Certainly, the scale of this project is without precedent in the history of Wichita's development. This, we feel, is a tremendous asset to the city, because it provides an opportunity to plan for the total development of a large tract of land in a rational and comprehensive way, instead of the traditional approach of piecemeal, scattered subdivision.

This document contains a description of the proposed master plan, a discussion of the technical details needed to implement the plan, and a recommended outline of P.U.D. submission requirements and procedures with suggested standards for impact review. The latter, we feel, fulfill the need for a legislative framework which is appropriate to the scale of Comotara and permits a means of monitoring the development process and of responding flexibly to new land development techniques.

We invite your comments and suggestions and look forward to working with you in the implementation of the Comotara master plan.

Very truly yours,

WICHITA LAND COMPANY

A DEVELOPMENT OF WICHITA LAND COMPANY / 2500 CLAIBORN CIRCLE / WICHITA, KANSAS 67226 / (316) 686-7451

INTRODUCTION

Comotara is a 3300 acre proposed open space community featuring a wide variety of housing types, a 700 acre business park, and nearly 700 acres of open space. The scale of the proposal is unprecedented in Wichita's history, and the unified development of an entire section of the city is in sharp contrast to traditional scattered subdivisions. Comotara thus offers new opportunities for the City of Wichita to achieve a comprehensively planned community in which all the integral elements of community life are designed and built to ensure safe, harmonious functioning.

The following report presents recommended modifications in the design standards of Wichita's Subdivision Regulations requested for Comotara that would be incorporated in a new PUD code. Since Comotara is a total community and not just a single subdivision, standards appropriate for conventional development may not always be most logical or protective of the city's interests. Due to the intensive investigations and comprehensive planning approach which support the Comotara proposal, the recommended design standards based on site-specific facts and extensive technical documentation. By incorporating these standards into the PUD process, the City can ensure exceptionally high quality development which is safe, efficient and technically sound, as has been demonstrated in numerous new communities and planned unit developments across the country.

Chapter 1 is a summary of the entire Comotara Concept with overall land use calculations and commitments.

Chapter 2 briefly presents a case for a new legislative devise for a community like Comotara.

Chapter 3 discusses recommended P.U.D. design standards for the circulation, drainage and flood control systems proposed for Comotara.

Chapter 4 outlines briefly a recommended P.U.D. structure and evaluative standards for legislatively controlling the impacts of such a large project.

The discussion of each recommended design standard first states the existing standard, followed by a explanation of the purpose of the proposed modification including the general design principle and specific application to Comotara, and concludes with supporting documentation from existing professional literature. An Appendix to the report contains acknowledgements, and additional technical support documentation.

CHAPTER 1

THE CONCEPT OF COMOTARA

Comotara is envisioned as a new community within the Metropolitan Wichita Region. As such, it will contain the diverse functions of living, working, shopping, and recreation which any complete community must possess. At the same time, Comotara will not be totally self-contained and independent, but will function as an integral part of the city, mutually depending upon and contributing to the economic strength of Wichita's existing commercial and business center.

As a residential community, Comotara seeks to meet a broad range of housing needs. A variety of housing types such as single family homes, townhouses, garden apartments, and mobile homes will be provided to satisfy the needs of families of different incomes, sizes, and stages of life. The result should be a community of greater social diversity than can be found in conventional suburban developments.

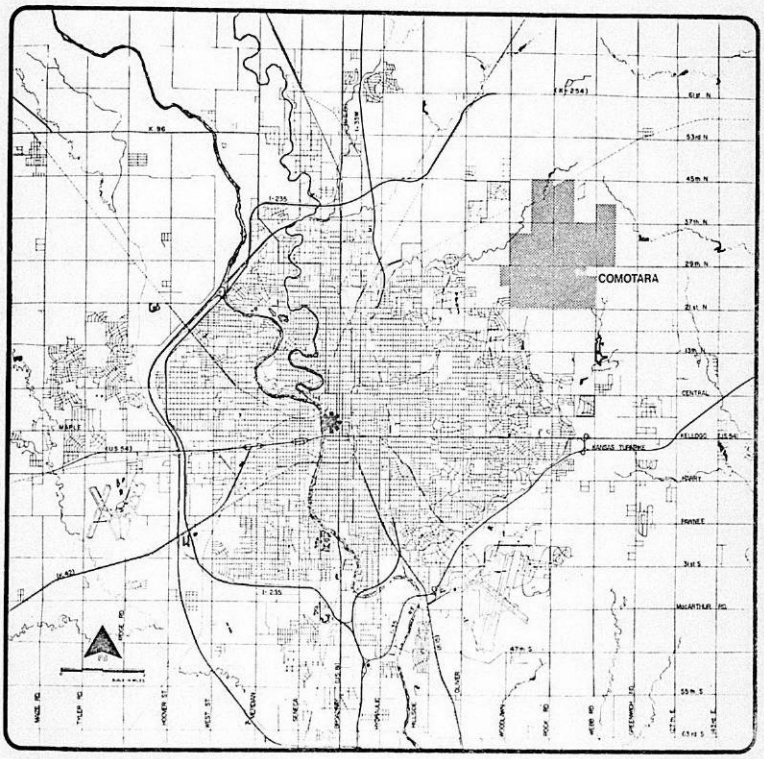
The residential areas of Comotara were designed with the objective of achieving neighborhoods which are cohesive social units with a strong physical identity and a human scale. To reinforce this identity, each neighborhood has been planned with its own open space area which can serve as a center for recreational and social functions.

A major objective of Comotara is to create a quality community which respects the natural environment and works with, rather than against nature to preserve the environmental integrity of the land. Provisions for open space and recreation facilities are major elements of the Comotara plan with more than 25% of the total site devoted to common open space for the dual purpose of conserving environmentally sensitive areas and meeting the increasing leisure demands of today's families. Fingers of open space suitable for bicycle and pedestrian paths have been planned which can link the neighborhoods of Comotara with major community facilities and open space areas.

In addition to residential uses, the plan of Comotara contains 700 acres of land devoted to a business-industrial park which will help to meet Wichita's need for increased employment opportunities and will provide future residents with an opportunity to live and work within a short commuting distance. A major asset to this business park will be the Piper Airport which will provide convenient air transportation to the commuting businessmen who will visit the business park. The Comotara Master Plan also contains several small neighborhood commercial centers to meet the convenience shopping demands of its residents. In addition, provisions have been made for a multi-purpose community center to be called Comotara Center, which will contain facilities for shopping, professional offices, entertainment, recreation and worship. The implementation of this center will, of course, depend on the residential growth of Comotara.

LOCATION

Comotara comprises 3300 acres of land northeast of the City of Wichita, Kansas. Most of the site lies between Webb Road on the east and Woodlawn Avenue on the west; it is bounded on the south by 21st Street and on the north by 45th Street. The area to the southwest of Comotara has been the location of much of Wichita's recent residential growth and is one of the finer residential areas in the City.



THE LAND PLANNING PROCESS: ANALYSIS

The feasibility of a major development such as Comotara depends on many factors:

1. What are the characteristics of the natural environmental systems of the site and what are their implications for land development?

2. Are the essential municipal services of water supply, waste water treatment, roads, and schools available to serve the proposed community and what are their design capacities?

3. Is there sufficient market demand to make the development economically feasible?

To answer these questions several research efforts were conducted and the major findings are reported below.

The Natural Environment

The 3300 acre tract of land on which Comotara will be constructed is well-suited to the type of community contemplated. Certain environmentally sensitive areas such as floodplains, hedgerows and shelterbelts were identified, however, and will require special consideration as indicated in the following summary.

Geology and Soils: Geology and soil conditions are major determinants of a site's suitability for development. The Comotara site lies within the Great Plains Region and is underlain by a bedrock formation comprised of Permian shale that appears at an average depth of 220 feet and poses no problem to development. There is no persistent aquifer underlying the site and the water table rarely rises to a level which would interfere with construction. Investigation also showed the soils to be generally of the Brewer and Fornium series which exhibit slow percolation rates. They also exhibit tendencies that make them an erosion hazard, particularly when the existing vegetative cover is removed, a condition which must be considered in both the planning and construction of Comotara.

Surface Drainage Patterns: The achievement of good site drainage and the prevention of flood hazards requires close attention to the natural drainage characteristics of the site. Comotara is in the headwaters of four subdrainage basins, and contains portions of two streams, East Chisholm and Gypsum Creeks. Flooding within and beyond the bounds of Comotara is attributed to heavy rainstorms over the headwater area, a steep channel gradient with a meandering course, slowly permeable soils and rapid water runoff rates. Consequently, storm water control has been identified as a major design consideration in the Comotara land use plan. The floodplains of Chisholm and Gypsum Creeks were delineated on the environmental composite map (see photograph) and a recommendation was made that no development should occur within these restricted areas. A system of storm water retention ponds is also recommended to prevent flooding downstream from the Comotara site and to prevent siltation of these stream courses.

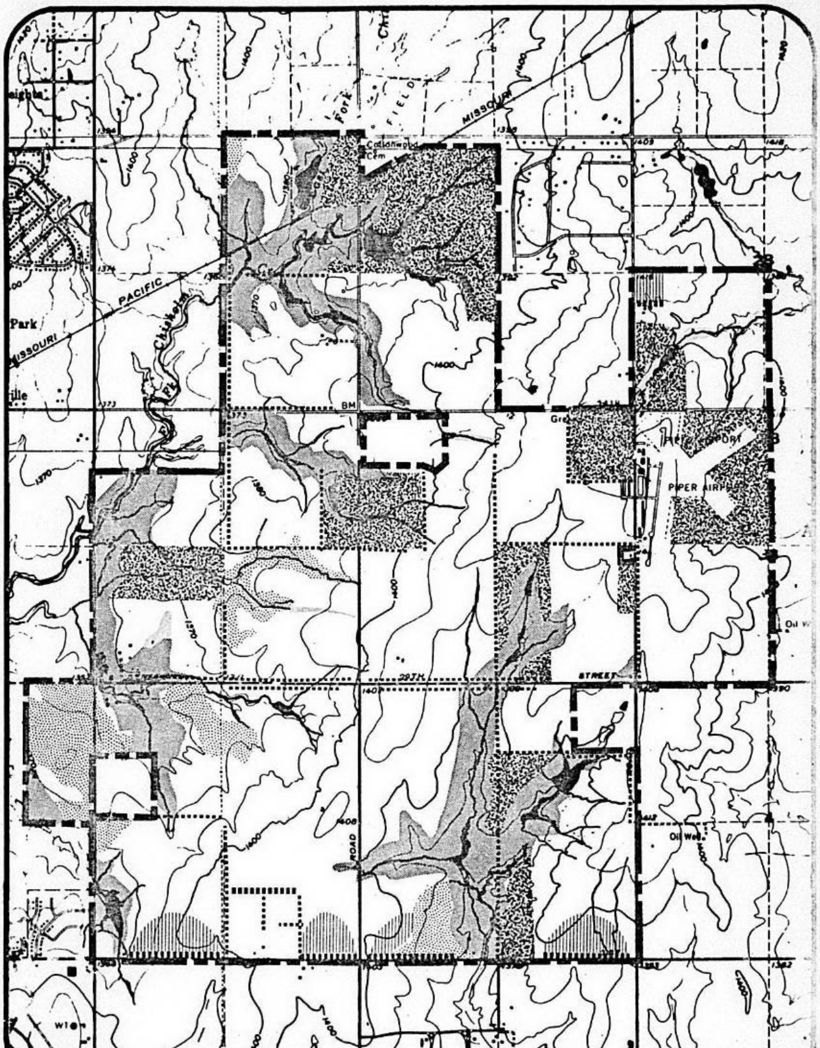
Vegetation: The natural vegetation of a site serves to prevent soil erosion, retain soil moisture and often provides visual amenity. Vegetation on the Comotara site is fairly representative of the Kansas landscape with a vast majority of the land in prairie-meadow, prairie-pasture and cropland. Tree cover is limited to small areas of shelterbelts and hedgerows which vary in density but are nonetheless effective in reducing winds and soil erosion. With few exceptions, the shelterbelts and hedgerows are proposed to be preserved for their environmental benefits and as significant landscape features which provide a sense of enclosure and scale in an otherwise rather open site. The meadow and pasture areas are grasslands which apparently have never been cultivated and exhibit native tall and mixed prairie grasses once indigenous to the Great Plains. These plant communities are a unique environmental resource and it is proposed in the Master Plan of Comotara that the prairie grass areas within the floodplains be preserved.

A summary of the environmental conditions which apply to the Comotara site is given on page 6.

SUMMARY OF ENVIRONMENTAL DETERMINANTS FOR DEVELOPMENT

(Accompanies map on the following page)

	Acres	% of Gross Site Area
SEVERE RESTRICTIONS		
Surface Water and Floodplain	610	19
Shelterbelts and Hedgerows	45	1
Drainage Corridors	30	1
Subtotal	685	21
MODERATE RESTRICTIONS		
Prime Agriculture	166	5
Sheltered Microclimate	76	2
Prairie Grasses	477	14
Subtotal	719	21
UNRESTRICTED FOR BUILDING	1892	58
Total	3296	100



MISSOURI
PACIFIC
MISSOURI
Park
Cottonwood Cem
FIELD
PIPER AIRPORT
STREET
ROAD
Oil Well

Municipal Services

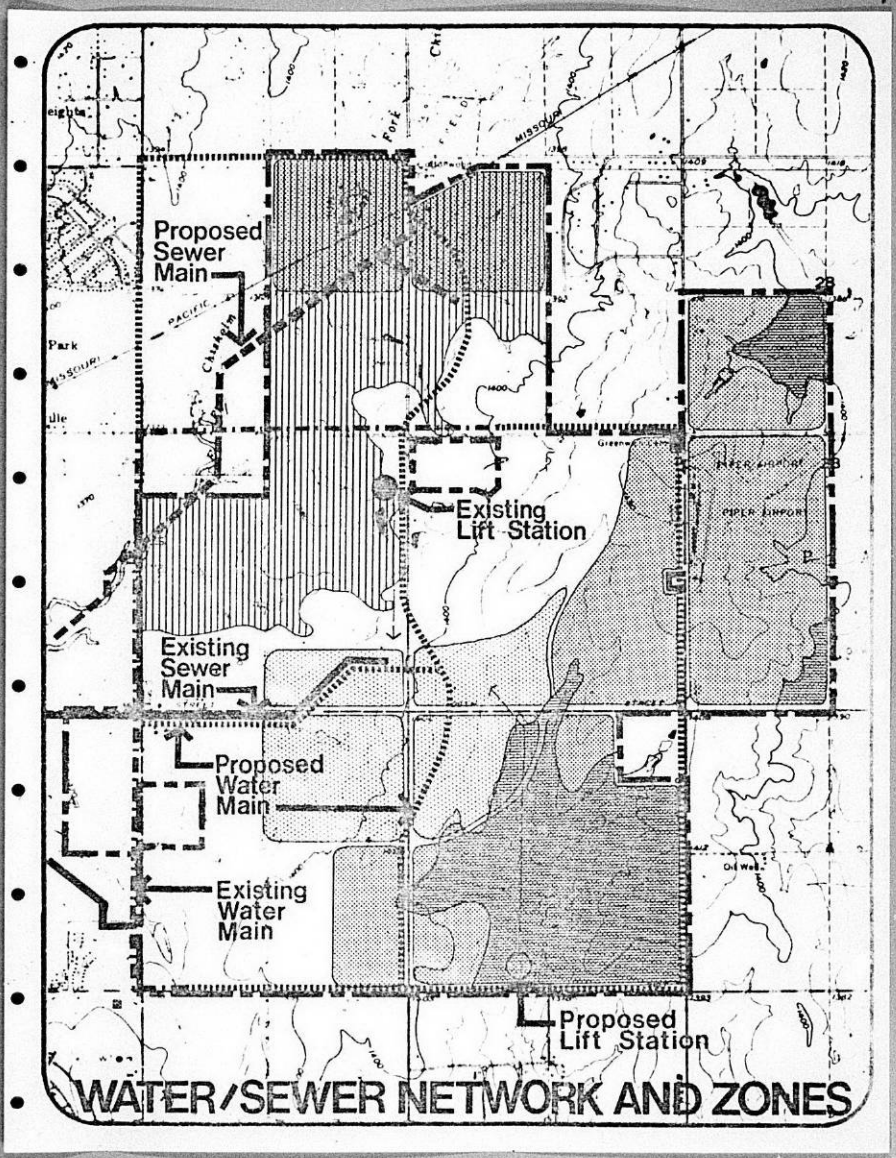
The feasibility analysis of municipal services examined the necessary technical support systems of waste water collection, water supply, and vehicular access, as well as existing school facilities in the vicinity of the site. It was concluded that the necessary support systems are available and that present or proposed design capacities would be sufficient to service the proposed Comotara development. The specific findings are as follows.

Waste Water System: The Comotara site lies in two municipal sewer districts which correspond to natural drainage areas. Presently the East Chisholm drainage area of the site is served by a 21 inch main along 29th Street to the center of Comotara and an interceptor has been planned to extend along Chisholm Creek. Service is not presently available within the Gypsum Creek drainage area but plans indicate that a 24" main line is approximately 1½ mile south of Comotara which can be extended to this portion of the site in the future. Present design capacities are sufficient to meet the needs for waste water collection. These conditions are depicted on the map and accompanying table on pages 8 and 9.

Water Supply System: The northeast section of Wichita is presently served by a booster pumping station at Murdock and an elevated storage tank at Woodlawn and 21st Street. In addition to this existing network, the city has planned an extensive sub-network to service the higher elevation areas of the northeast sector which will include a new booster pumping station at 29th and Woodlawn and a distribution network which, when completed, would provide adequate service for any projected land uses in the Comotara site. Twenty-four inch mains along Woodlawn Avenue and 37th Street from Woodlawn to Rock Road presently service the site. These conditions are depicted on the map and accompanying table on pages 8 and 9.

SEWER ZONES

WATER SUPPLY ZONES	ZONE A Land within gravity limits of existing network: Capacity = 4.1 mgd	ZONE B Land within gravity limits of proposed network: Capacity = 7.8 mgd	ZONE C Land beyond gravity limits Capacity not determined	AREA TOTALS
ZONE A Land within a half-mile of existing network: Capacity = 3.0 mgd			Not Applicable	1635 Acres 43 %
ZONE B Land within a half-mile of loop extension Capacity = 3.5 mgd		Not Applicable		788 Acres 21 %
ZONE C Land within service area of extended mains: Capacity = 3.5 mgd				1343 Acres 36 %
AREA TOTALS	2385 Acres 63 %	866 Acres 23 %	504 Acres 14 %	3766 Acres 100 %

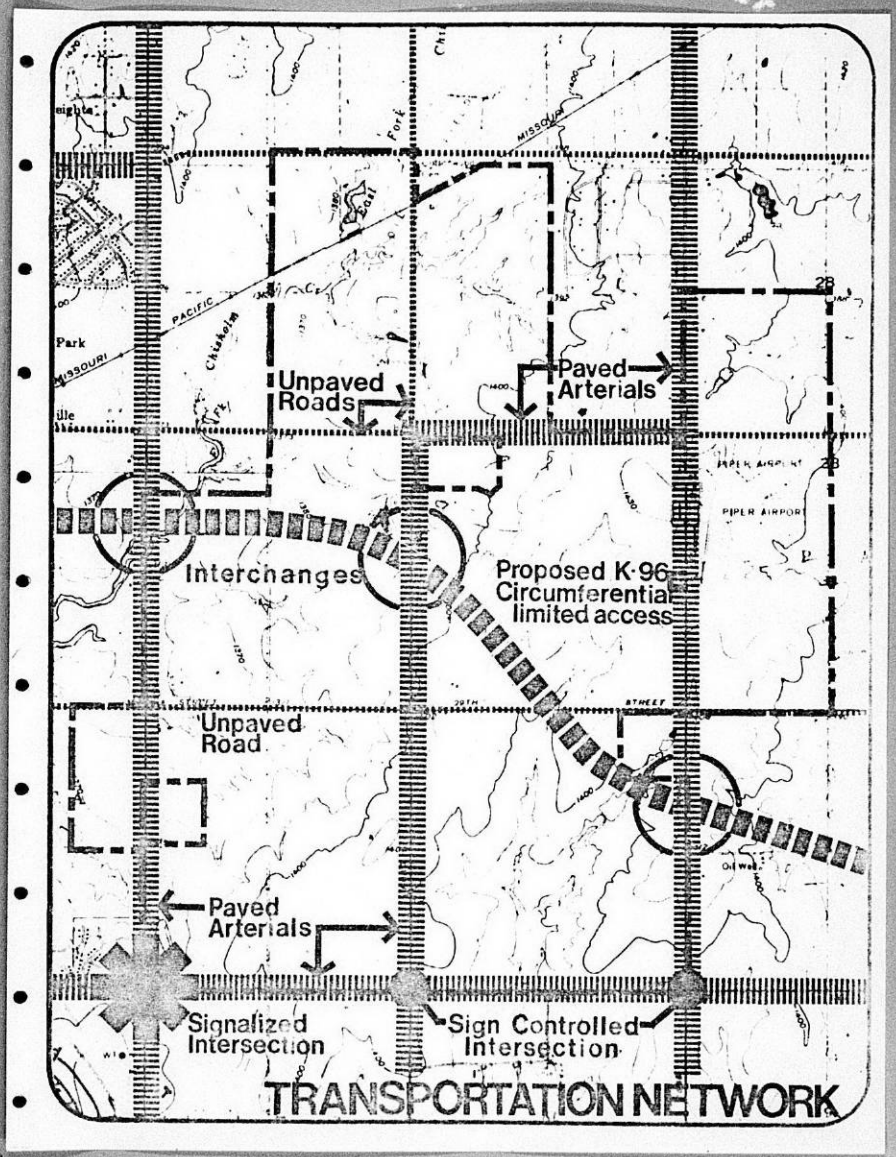

Proposed
Sewer
Main
Existing
Lift Station
Existing
Sewer
Main
Proposed
Water
Main
Existing
Water
Main
Proposed
Lift Station
WATER/SEWER NETWORK AND ZONES

Vehicular Access: Assuming that improvements to the existing arterials on the perimeter of the site will be made when sufficient demand is generated, the existing mile-grid network was found to have adequate capacity to serve Comotara. Woodlawn Avenue, Rock Road and 21st Street are the major thoroughfares that will collect and distribute traffic from the Comotara site. The completion of the Northeast Circumferential (K-96), a four-lane limited-access highway which is now in the planning stages, will also provide additional vehicular access to the site, particularly for the traffic which will be generated by the business park at Comotara. The existing and proposed design capacities of the arterial network are summarized in the table below.

SUMMARY OF VEHICULAR CAPACITIES AVAILABLE TO THE COMOTARA SITE

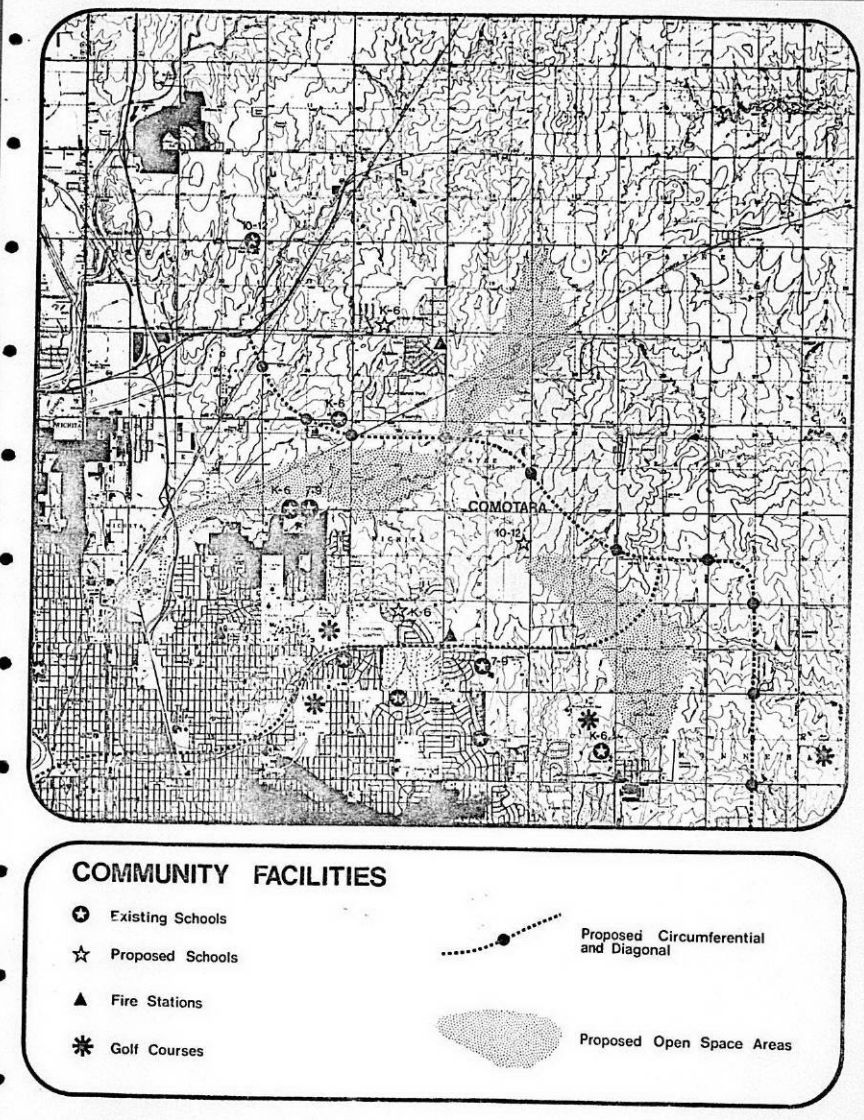
Condition	Vehicular Capacity
Existing Capacity (two-lane arterials)	14,000 adt
Proposed Capacity (four-lane arterials)	Additional 9,000 adt
Proposed Capacity (with completion of K-96)	Additional 43,000 adt

adt = average daily trips


Unpaved Roads
Paved Arterials
Interchanges
Proposed K-96 Circumferential limited access
Unpaved Road
Paved Arterials
Signalized Intersection
Sign Controlled Intersection
TRANSPORTATION NETWORK

School Facilities: Most of the Comotara site is located within the City of Wichita School District (U.S.D. 259). Schools which will serve the site in the immediate future include Kistler Elementary (soon to be phased out), Brooks Jr. High, and Heights Sr. High (see Community Facilities Map). As a result of declining enrollments, the public school system is currently operating at less than design capacity and has sufficient classroom space to meet demands generated by Comotara for the first few years. Located within Comotara is a future high school site which was purchased several years ago by the Board of Education and which will be developed when there is sufficient demand.

Recreation Facilities and Open Space: Several golf courses, both public and private are located within a few miles of the Comotara site and the City of Wichita has also recently acquired Chisholm Creek Park across Woodlawn Avenue from Comotara. The Open Space, Parks and Recreation Plan (1965) was also consulted and the two areas of the Comotara site which were designed as proposed sub-regional parks have been delineated on the Community Facilities Map.



COMMUNITY FACILITIES

- Existing Schools
- Proposed Schools
- Fire Stations
- Golf Courses
- Proposed Circumferential and Diagonal
- Proposed Open Space Areas

Market Feasibility Analysis

A study of the market potentials for residential, commercial, and industrial land in the Wichita region was prepared by the nationally-known market research firm of Hammer, Siler, George. Their report concluded that although the rate of growth in Wichita slowed during the 1960's, the period from 1970 to 1990 would show a fairly strong recovery in both population (estimated increase of 30%) and housing construction (estimated increase of 41% in the total housing supply). The market potentials for the project as estimated by Hammer, Siler, George are given in the table below. These estimates were employed as guidelines as to the total number of units and the annual pace of construction.

MARKET POTENTIALS: TOTAL PROJECT

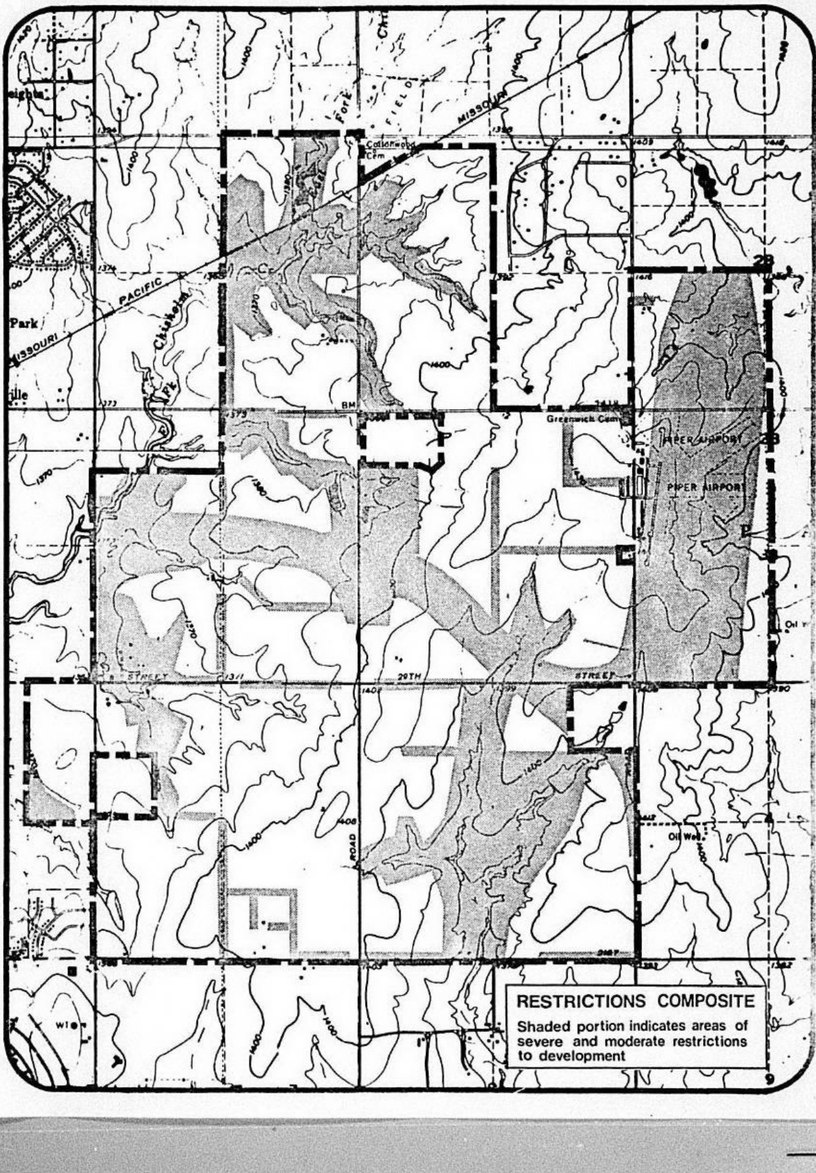
Unit Type	Number of Dwelling Units by Period 1973-1980	1980-1985	1985-1990	Total
Single-family Detached	1,035	1,172	1,465	3,672
Condominium (TH, TR, QUAD)	457	554	773	1,784
Rental Apartments	858	861	822	2,541
Total Units	2,350	2,587	3,060	7,997
Industrial Land (acres)	68	101	159	328
Commercial Land (acres)	3.9	2.7	4.1	10.7
Total of Industrial and Commercial Acreage	71.9	103.7	163.1	338.7

THE LAND PLANNING PROCESS: SYNTHESIS

Initial Considerations

One of the first elements of the Comotara Master Plan to be considered was the location of the Northeast Circumferential. Although the alignment of this highway has not yet been fixed, the general corridor, which has been approved in public hearings, bisects the Comotara site in a northwest-southeast direction. Several alignments through the site were considered and one was recommended which minimizes environmental damages and fragmentation of the buildable land areas.

Next, a Restrictions Composite Map (see photograph) was created which delineates areas of severe and moderate restrictions to development. Floodplains, shelterbelts, and hedgerows were indicated on this map, as well as the noise zones which surround the airport and the proposed Circumferential Highway (K-96) and the numerous utility easements which crisscross the Comotara site. The land areas which remained after this series of restrictions overlays were regarded as suitable for development.


MISSOURI PACIFIC
Park
Cottonwood Cem
Greenwich Cem
PIPER AIRPORT
PIPER AIRPORT
29TH
STREET
ROAD
Oil Well
RESTRICTIONS COMPOSITE
Shaded portion indicates areas of severe and moderate restrictions to development

The design concept which emerged considered the site as a rectangular area divided into four quadrants by Rock Road and the proposed circumferential. Residential land uses were allocated to the southwest quadrant because of existing residential uses in the vicinity, and to the northwest and southeast quadrants to capitalize on the open space amenities which would be created within the floodplains. The northeast quadrant was designated for the business park in order to utilize access to the airfield and the Missouri Pacific Railroad which borders the north end of the Comotara site. This quadrant is also more suited to non-residential uses because of the noise created by aircraft activity at Piper Airport. At the center of the site, near the interchange of Rock Road and K-96 was placed the multi-purpose Comotara Center for convenient access from all parts of Comotara.

The precise location of specific land uses was guided by a land use matrix (see pages 16 and 17), which identifies combinations of uses which are compatible, incompatible or compatible within certain conditions. The result of this land use allocation process is shown on the Comotara Master Plan (color photo) with land use areas summarized on the accompanying table.

A comparison of the proposed development program and the Market Potential Summary on page 13 shows some variation from the initial market program of Hammer, Siler, George. Industrial land acreages were doubled to allow for the Business Park concept, which requires more land in order to be executed properly. Consequently this resulted in a reduction in the number of residential units from the initial market program.

LAND USE CONSTRAINTS	proposed on-site and existing off-site	RESIDENTIAL						COMMERCIAL			INDUSTRIAL		OPEN SPACE			ROADS	
		SINGLE FAMILY		TOWNHOUSE	GARDEN APT 2	GARDEN APT 3 STORY		NEIGHBORHOOD/ CONVENIENCE		COMMUNITY	OFFICE/RESEARCH	MFG/WAREHOUSE	ACTIVE REC	PASSIVE	AGRICULTURE	EXPRESSWAY	MAJOR ARTERY
proposed on-site		ON-SITE	OFF-SITE	ON-SITE	ON-SITE	ON-SITE	OFF-SITE	ON-SITE	OFF-SITE	ON-SITE	ON-SITE	ON-SITE					
AGRICULTURE		1	○	7	●	●	○	●	○	○	○	○	○	○	○	○	○
RESIDENTIAL	SF	○	1	2	3	●	●	●	●	●	●	●	4	○	1	●	●
	TH (DUP, TR, QUAD)	2	●	○	○	6	●	5	●	●	●	●	4	○	7	●	●
	GA2	3	●	3	○	○	●	○	●	8	8	●	4	○	7	●	●
	GA3	●	●	6	○	○	●	○	●	8	8	8	4	7	●	●	●
COMMERCIAL	COMMUNITY	●	●	●	8	8	●	●	●	○	○	9	4	○	○	○	○
	NEIGHBORHOOD	●	●	5	○	○	●	○	●	●	9	9	○	○	○	●	○
INDUSTRIAL	OFFICE / RESEARCH	●	●	●	8	8	●	9	●	○	○	○	○	○	○	○	○
	MFG / WAREHOUSE	●	●	●	●	8	●	9	●	9	○	○	○	○	○	○	○
OPEN SPACE	ACTIVE REC	4	4	4	4	4	4	○	●	4	○	○	○	○	○	4	4
	PASSIVE	○	○	○	○	7	○	○	○	○	○	○	○	○	○	○	○

○ COMPATIBLE

1 COMPATIBLE – SUBJECT TO CONDITIONS (see footnotes)

● NOT COMPATIBLE

LAND USE CONSTRAINTS: CONDITIONS FOR COMPATIBILITY

FOOTNOTES TO THE TABLE

1 Compatibility subject to the following conditions:

Single family and duplex must be provided with large lots or farmsteads of approximately 10-15 acres.

Results:

Maintain open boundary for Comotara. Lessen impact of site development on off-site areas and vice versa. Increase variety of housing types.

Relative Cost:

Low

2 Compatibility subject to the following conditions:

The minimum distance between single family home and a townhouse must be 150' or

The minimum distance between single family home and a townhouse may be 100' if a natural buffer at least 20' high is provided or if there is a 10' grade change, or

Townhouse must be designed at lower density (6 du/ac).

Results:

Maintain comfortable scale for single family areas. Allow different types of housing to be sited close enough to create communities. Provide variety of housing types.

Relative Cost:

Possible loss of buildable land. Cost of natural buffer. Loss of density.

3 Compatibility subject to the following conditions:

The minimum distance between single family home and a garden apartment structure must be 250' or

The distance between single family home and garden apartment may be 175' if a natural buffer at least 20' high is provided, or

Garden apartments must be designed at significantly lower density.

Results:

Maintain comfortable scale for single family areas. Allow different types of housing to be sited close enough to create communities. Provide variety of housing types.

Relative Cost:

Possible loss of buildable land. Cost of natural buffer. Loss of density.

4 Compatibility subject to the following conditions:

Setbacks from active recreation must provide adequate safety for both the participants and the residents and sufficient privacy and quiet for the residential areas.

Generally the setback distance and the intensity of recreation should be directly proportional.

Results:

Utilize active recreation areas as open space without hazard to residents. Provide recreation facilities in close proximity to residential areas.

Relative Cost:

Possible loss of buildable land. Cost of natural buffers.

5 Compatibility subject to the following conditions:

Residences shall not be lotted off same access road that services a commercial use.

The minimum distance between residental structures and commerical structures must be 100' or

The minimum distance between residental and commerical structures may be 65' if a natural buffer at least 20' high is provided.

Results:

Maintain hierarcy of vehicular circulation. Create compact community without forfeiting privacy for safety.

Relative Cost:

Possible loss of buildable land. Cost of natural buffer.

6 Compatibility subject to the following conditions:

The minimum distance between a townhouse or duplex and a 3 story garden apartment must be 150' or

The minimum distance between a townhouse/duplex and a 3 story garden apartment may be 100' if a natural buffer 20' high is provided, or

3 story garden apartments must be designed at significantly lower density.

Results:

Maintain a comfortable scale for townhouse/duplex areas. Provide adequate areas to handle increased runoff.

Relative Cost:

Possible loss of buildable land. Cost of natural buffer. Loss in density.

7 Compatibility subject to the following conditions:

Maximum building height of 30.

A natural buffer at least 10' high must be provided between the building and the agricultural land/open space.

The buildings that directly abut the agricultural/open space must be designed at a lower density.

Results:

Utilize farm lands as open space. Variety of living areas.

Relative Cost:

Cost of natural buffer. Loss of density.

8 Compatibility subject to the following conditions:

The commercial, light industrial or office/research uses must be of a type that do not create noise and air pollution.

The vehicular access to the apartments must be separate from that to the comerical/industrial/office area.

A natural buffered area of at least 250' must be provided between commercial/industrial/office and apartments, or

Apartments may be directly adjacent to or within office/research and commercial centers if the entire development area is landscaped.

Apartment area must abut open space on at least one side.

Results:

Intensify land use in certain areas. Provide variety of housing alternatives.

Relative Cost:

Cost of buffer.

9 Compatibility subject to the following conditions:

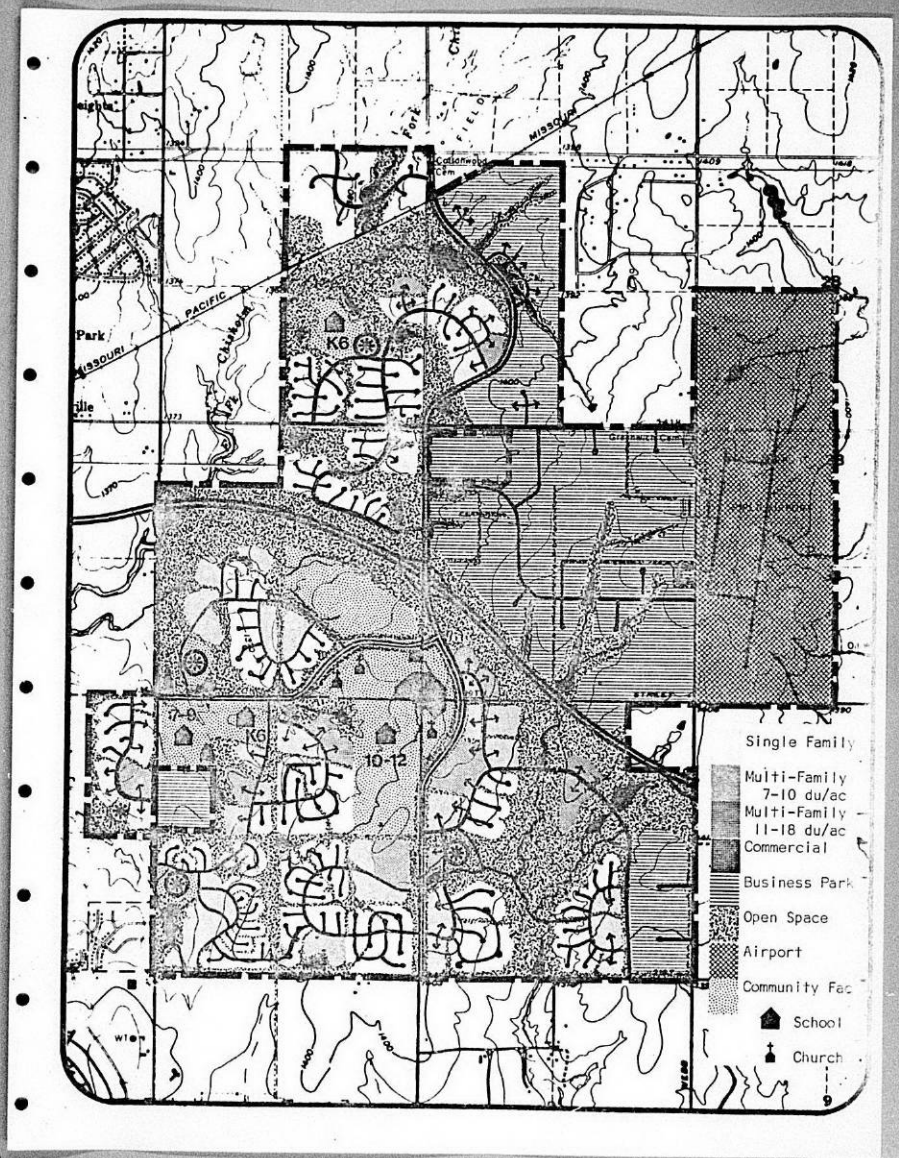
Light industrial/office uses may be located in commerical areas if the industrial/office structures are of the same scale as the commercial structures and if the industrial/office uses do not create excessive noise and air pollution or generate excessive traffic.

Results:

Diversified centers that intensity activity.

LAND USE CALCULATIONS

Use Type	Acres	Dwelling Units	% of Gross Site
RESIDENTIAL			
Single Family @ + 4 acres lots	68	19	2.1
Single Family @ 2½-4½ du/ac	332	1052	10.1
Mobile Homes @ + 5 du/ac	120	600	3.7
Multi-Family 1 @ 5-9 du/ac	281	1969	8.5
Multi-Family 2 @ + 12 du/ac	113	1356	3.4
Multi-Family 3 @ ± 16 du/ac	30	480	0.9
Residential Sub-Total	944	5474	28.7
COMMERCIAL			
Neighborhood Centers	10		0.3
Comotara Center	20		0.6
Business Park	700		21.2
Airport	378		11.5
Commercial Sub-Total	1108		33.6
ROADS			
K-96 Circumferential R.O.W.	112		3.4
Access Roads R.O.W.	266		8.1
Road R.O.W. Sub-Total	378		11.5
COMMUNITY FACILITIES			
Schools: Senior High	82		2.5
Junior High	34		1.0
Elementary (2)	41		1.2
Community Facilities	21		0.6
Open Space	688		20.9
Community Facilities Sub-Total	866		26.2
TOTAL	3296	5474	100%


K6
K6
7-9
10-12
Single Family
Multi-Family
7-10 du/ac
Multi-Family
11-18 du/ac
Commercial
Business Park
Open Space
Airport
Community Fac
School
Church

Design Features

The vehicular circulation system of Comotara features a hierarchical pattern of roads: arterials, collectors, and local roads. It is proposed that existing Rock Road, the major north-south arterial within Comotara be realigned in two locations to take advantage of a ridgeline which provides natural visual separation between the east and west portions of the site. Other arterials in the plan include 37th Street which has been retained in its present location and 29th Street which has been realigned and terminated at Rock Road. A series of collector streets provide circulation through the individual neighborhoods of Comotara. There are no lots or driveways along either arterials or collectors to interrupt traffic flow, and T-intersections have been employed wherever possible, because they are less hazardous than X-type intersections. Culs-de-sac and loop roads have been used extensively to minimize traffic along residential streets.

The land use plan for Comotara features design concepts which work with nature by utilizing natural drainage patterns for storm water control. A system of retention basins and siltation ponds is recommended to prevent excessive runoff from the Comotara site and to prevent water pollution. Where possible, open swales will provide an effective and economical means of surface drainage.

Comotara is composed of seven residential neighborhoods, varying in size from 80 acres to about 200 acres. Each neighborhood has an area reserved for community use which could contain recreational facilities such as children's playgrounds and playfields for softball and baseball, etc.

Other amenities include two major open space areas which the developer proposes to dedicate to the City of Wichita for flood control and public recreation purposes. The 106 acre open space area around Chisholm Creek could become an extension of Chisholm Creek Park and the 162 acre open space area adjacent to Gypsum Creek has potential for a municipal golf course. Another amenity is a proposed commercial recreation facility as part of Comotara Center with a swim and tennis club. Buffer strips, drainage swales, and utility easements which form a network throughout the site have potential for pedestrian and bicycle paths which can provide convenient and direct access to all public open spaces for use and maintenance.

Four school sites have been designated on the Comotara Master Plan. The future high school site on Rock Road is presently owned by the School Board. The other proposed sites will be reserved for acquisition by the School Board and include two elementary school sites, one each for the north and south portions of Comotara and a junior high school site at Woodlawn Avenue and 29th Street. The projected school-age population at Comotara is shown on page 22 .

Project Impacts

The impacts of the proposed Comotara project in terms of total population, school age children, traffic and waste water generations, water consumption, impervious cover, municipal and school tax revenues are shown in the following tables. Comparison with municipal service design capacities identified in a previous section of this report will show that these impacts can be accommodated and that the increase in school enrollments can be accommodated by development of the school sites proposed in the Master Plan.

SUMMARY OF PROJECT IMPACTS

	Traffic Generation		Waste Water Generation		Water Consumption		Impervious Cover	
Number of Units By Type	ADT Per Unit	Total	GPD Per Unit	Total	GPD Per Unit	Total	SQ.FT. Per Unit	Total
1669 Single Family	12.0	20028	700.0	1,168,300	350.0	584,150	1816.7	3,032,072
1969 Townhouses	8.0	15752	450.0	886,050	225.0	443,025	1350.0	2,658,150
1836 Garden Apartments	6.0	11016	316.0	580,176	188.0	345,168	1175.0	2,157,300
700 Acre Business Park	10.0	7000	1000.0	700,000	600.0	420,000	2375.0	1,662,500
30 Acres of Commercial	10.0	300	450.0	13,500	300.0	9,000	2375.0	71,250
Weighted Average	8.72		539.7		290.4			
Total		54,096		3,348,026		1,801,343		2,581,272*

* Includes Roadways

Total Coverage, including all impervious surface is less than 15% of the Total Site Area

ADT = Average Daily Trips; GPD = Gallons per Day

PROJECTIONS OF SCHOOL TAX REVENUES AND SCHOOL AGE POPULATION (OVER 17 YEARS)

Dwellings Constructed	5,474
Acres of Commercial & Business Park Development	730
No. of School Children:	
Elementary	2,936
Jr. High	1,268
Sr. High	1,034
Total Tax Revenues	$26,787,000

ASSUMPTIONS: Assessment Factor 30%
Millage Rate (School) 46.392 mills

Unit Type	Pupils Per Unit Type			Annual Tax Revenues Per Unit
	Elementary	Jr. High	Sr. High	
Single Family	0.70	0.36	0.34	$626
Townhouse	0.59	0.25	0.16	487
Garden Apartments	0.32	0.09	0.09	376
Commercial	0.00	0.00	0.00	557
Business Park	0.00	0.00	0.00	348

PROJECTIONS OF MUNICIPAL TAX REVENUES AND POPULATION (OVER 17 YEARS)

Dwellings Constructed	5,474
Acres of Commercial & Business Park Development	730
Total Number of People	23,639
Total Tax Revenues	$18,310,200

ASSUMPTIONS: Assessment Factor 30%
Millage Rate (City) 34.180 mills

Unit Type	People Per Unit	Sales Price	Tax Revenues Per Unit
Single Family	3.5	$45,000	$461
Townhouses	3.0	35,000	359
Garden Apartments	2.5	27,000	277
Commercial	10.0	40,000/acre	410
Business Park	10.0	25,000/acre	256

CHAPTER 2

IMPACT ZONING: AN ALTERNATIVE APPROACH

During the past several years, new legislation and new land planning techniques have evolved, that enable a community to develop methods to exercise a much higher degree of quantitative and qualitative control of new land developments than is possible under standard techniques. The key words in this approach are "Impact Evaluation," or the ability to evaluate a land development's effects on many facets of the community's infrastructure before the fact, rather than being forced to react after the fact.

The simplest is to acquire the data necessary for "Impact Evaluation" by requiring the potential developer to assemble all pertinent data and then apply the measuring tools on a project by project basis. This method has the advantage of being immediately implementable, with the costs to the community at a minimum.

Normally a conventional Master Plan inventories only general physical data, and from this base develops land use categories, which reflect various types of land use and various intensities of uses in a fixed format. This document is then codified into an implementation tool, which is normally a zoning ordinance and map.

In order to provide the statutory flexibility that enables the Community to exercise both qualitative and quantitative control of land development, Planned Unit - Planned Residential Development ordinances have been developed. For this type of flexible statute to properly work, "Stringent Performance Standard" are absolutely necessary. It is the evaluation of a development against these performance standards that permits the flexibility of location and use intensity while still maintaining proper control.

The performance standards against which a development should be measured fall into the following four categories.

1. Natural systems - An inventory and analysis of the sites, soils, vegetation, hydrology, geology, and topography will establish the capacity and sensitivity of the site's natural systems to development. With this data, potential development impacts can be evaluated. For instance:

   a. The ability of a site to handle its storm water runoff so that it will not cause adverse effects on adjoining properties or involved watersheds.

   b. The construction on the site will not cause any serious or permanent erosion and/or sediment problems downstream.

   c. The development will respect all significant stands of existing vegetation.

   d. Development will not adversely affect aquifer recharge areas due to excess land coverage.

2. Man-made systems - An inventory and analysis of the site's and adjacent roads, sewage disposal facilities, water distribution facilities, school facilities, and storm water disposal systems will establish the capacity and sensitivity of the service systems in relation to development. With this data, potential development can be evaluated. For instance:

   a. The sewage produced by the development cannot exceed the sewage treatment facility's capacities.

   b. The development cannot utilize more water than the community's capacity to supply this resource.

   c. The development cannot generate more traffic than the roads have the capacity to accept.

   d. The development cannot generate more school children than the tax revenues generated by the development can support.

3. Market system - An analysis of the community's and the site's market potential and the community's ability to accept a fair share of the overall projected regional growth will establish the capacity and sensitivity of both the site and the community to development. With this data, potential development can be evaluated. For instance:

   a. The development proposal must be backed by a market study documenting the demand for the number, type, and projected price range. To be verified by the community.

   b. The developer must not propose to construct a number of units greater than the community's fair share of the region's housing demand.

4. Fiscal system - An inventory and analysis of the community's assessment and tax procedures, capital and operational expenditures, and broken down into taxation and revenue jurisdictions, i.e. community, county, and school district(s), will establish the capacity and sensitivity of the community to development. With this data, potential development can be evaluated. For instance:

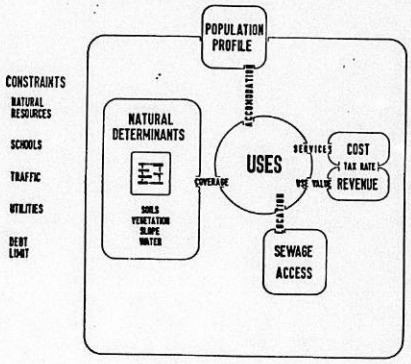
   a. The development cannot demand more dollars worth of services than the tax revenues generated.

   b. The development cannot demand that the community assume a bonded debt to supply capital improvements beyond their legislated debt limit.

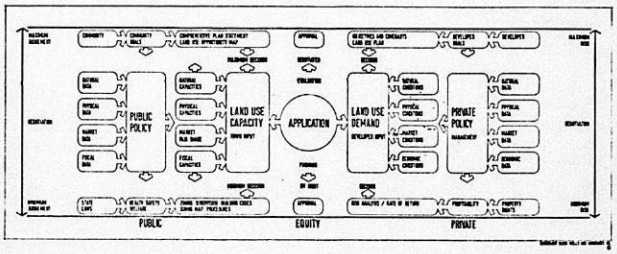
The crux of the legislative controls is that the development shall not produce adverse impact on any of the above systems. When the effects of a proposed development have an adverse impact on the defined limits of any of these systems, the development should not occur until steps have been taken to correct the inadequacy in the system(s).

The following diagrams briefly summarize the alternative method to either determine or evaluate proposed land uses. Whether done through revised comprehensive planning and revamped statutes or through specific request to developers and reviewed project by project. This method can be used now. Implementation is relatively easy and is well worth considering utilizing the state P.U.D. enabling legislation.

Development Impact Model



The Negotiation Process



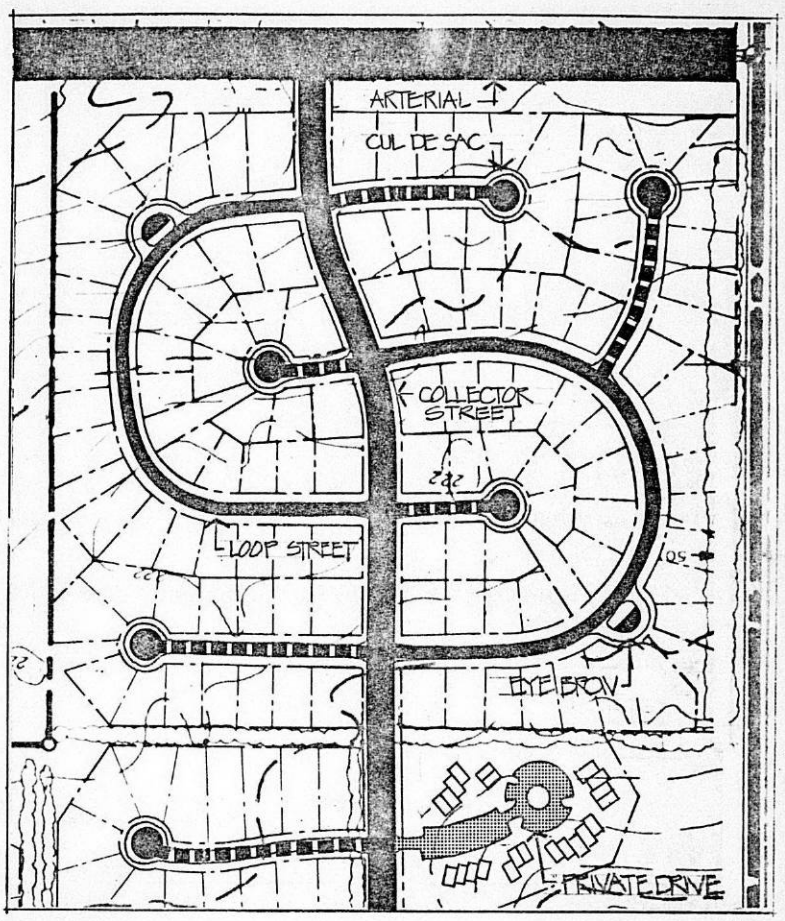
CHAPTER 3

RECOMMENDED P.U.D. DESIGN STANDARDS

The preceding chapters have given a general overview of the Comotara master plan and recommended legislation. Essential to making such a plan a reality is giving close attention to the details of planning, design and construction. That the City of Wichita, too, attaches importance to design details as a means of attaining safe, efficient, technically-sound and high-quality neighborhoods, is evidenced by the design standards contained in the Subdivision Regulations.

STREET AND CIRCULATION SYSTEM

Appropriate street width is a function of probable traffic volumes, parking needs and controls, probable vehicle speeds, limitations imposed by terrain, and maintenance needs. The minimum width which will reasonably satisfy these elements should be selected. Any reduction in pavement width will reduce both construction costs and future maintenance and resurfacing costs. Narrower pavements also mean less impervious cover with the consequent reduction of peak storm flows and concentration of water. Reduction of bituminous paving and impervious cover will also increase the possibility of percolating storm runoff into the ground water table. (See discussion of storm water systems.) Figure R-1 outlines the proposed hierarchical street system that will be used throughout Comotara.



COLLECTOR
LOOP STREET
CUL DE SAC
EYEBROW
PRIVATE DRIVE

DETAIL: ROAD/STREET CLASSIFICATION

JOB: COMOTARA

SC: 1" = 200'
DR: DS

INDEX CODE: R 0 1

Street Width Standards

The following chart outlines the recommended street standards for a project such as Comotara reviewed under PUD legislation.

Three new street types are also proposed: divided collector, eye-brow and private drive. These proposed street width standards are as follows:

Type	Right-of-Way	Travel Lanes	Parking/ Shoulder	Total Pavement
Collector Street				
Current	70'	2-12'	2-8'	40'
Proposed	70'	2-12'	2-4'	32'
Loop Street				
Current	64'	2-9'	2-8'	34'
Proposed	60'	2-10'	1-8'	~~30~~ ~~28~~ ~~26~~
Cul-de-Sac				
Current	60'	2-9'	2-8'	34'
Proposed	50'	2-9'	1-8'	~~28~~ ~~26~~ 30
New Street Types:				
Divided Collector	100'	2-12'	2-4'	32'
Eye-Brow	130' dia.	2-9'	1-8'	~~28~~ 30
Private Drive	--	2-10'	None*	20'

43' total

(23' Parking)

* Parking bays provided.

A description of each street type with typical detail follows:

1. Collector and Divided Collector streets are designed to convey vehicles from local streets to arterials. Parking along these streets will not be necessary since they provide for through circulation only and will have no direct driveway access. Therefore, these streets should consist of two travel lanes and sufficient shoulders to accommodate disabled vehicles.

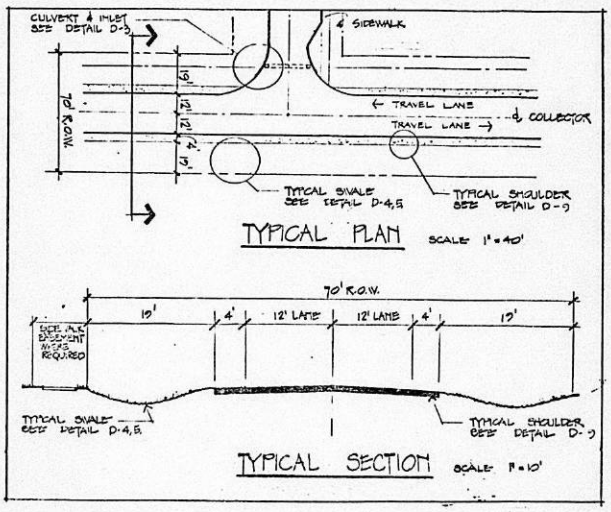


Figure R-2. Typical Collector Street

2. Loop streets are designed to collect traffic from culs-de-sac and private drives and convey this traffic to the collector streets. These streets may accommodate limited over-flow parking, and therefore one parking lane is recommended.

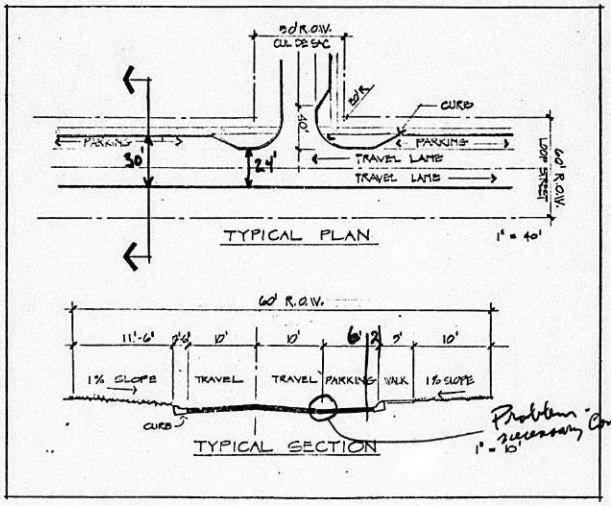


Figure R-6. Typical Section: Loop Street

3. Culs-de-sac are designed to provide direct access to individual single family lots. Because these streets do not permit through traffic and may be used for over-flow parking, one parking lane is necessary with two travel lanes. Special topographical considerations may require slightly greater lengths than the subdivision regulation of 600 feet, but never more than permits adequate fire fighting access.

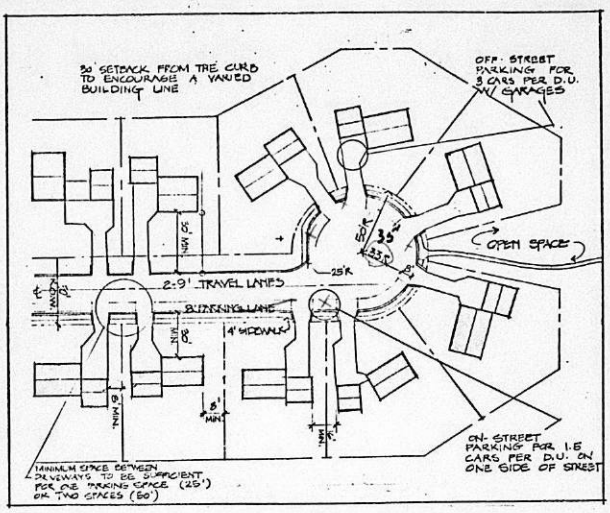


Figure R-7. Typical Layout of Cul-de-sac

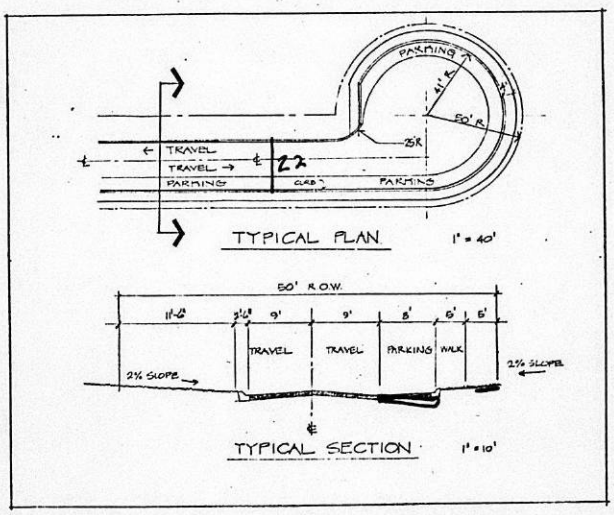


Figure R-8. Typical Section: Cul-de-sac

4. Eye-brow are designed to provide direct access to clusters of not more than six units off loop streets. The general standards for culs-de-sac should apply.

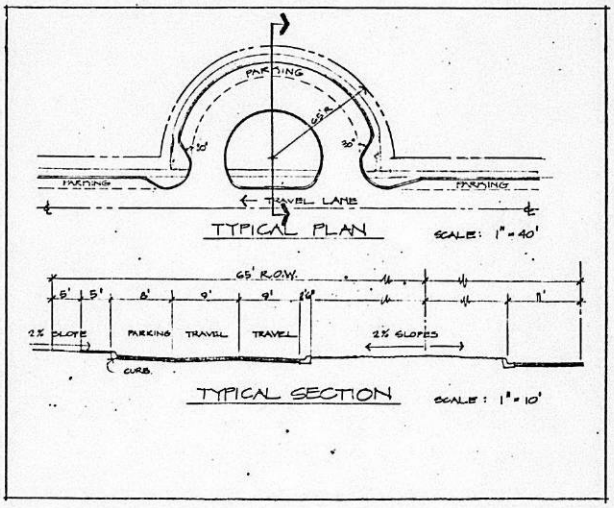


Figure R-10. Typical Eyebrow

5. Private drives are designed to provide direct access to multi-family housing. These streets do not encourage through traffic and are not dedicated. The use of curbing or parking lanes is not generally necessary as sufficient parking is located in off-street areas adjacent to each dwelling unit.

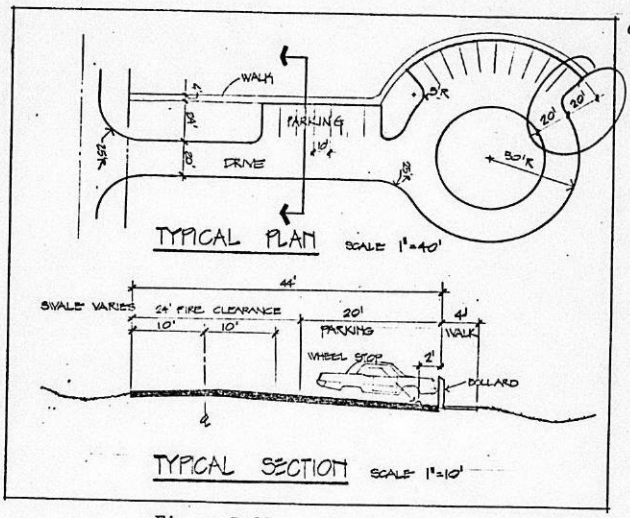


Figure R-11. Private Drive

The following design criteria served as a basis for the proposed street standards:

Type	Design Speed	Capacity (ADT)
Divided Collector	35+	1500 - 5000
Collector	35+	1500 - 5000
Loop	25	250 - 2000
Cul-de-Sac	25 or less	0 - 250
Eye-Brow	25 or less	0 - 250
Private Drive	25 or less	0 - 250

The reduction in street widths is achieved primarily through the provision of parking lanes only where they are necessary for safety. According to the subdivision regulations at least 3 off-street parking spaces per dwelling unit must be provided for local low-density residential streets without parking lanes. The parking design standards proposed for Comotara would accommodate not only 3 off-street parking spaces per dwelling unit but also an additional 1.5 on-street parking spaces per dwelling unit (see Appendix, Figures R-5, 7 and 9). One parking lane, using a special curbing technique to control one-side parking, thus provides more than adequate parking facilities. Since the main purpose of collector streets is to convey traffic to arterial roads, on-street parking is not necessary for collector roadways, and should be prohibited to provide safer free flowing traffic movement. All roads are wide enough to provide required fire fighting clearance (see Appendix), especially with the provision of additional 4 foot clearance on private drives.

Because street intersections increase the possibility of vehicular or pedestrian accidents special consideration has been given to these areas. In order to accommodate the clear sight distances at intersections, no parking or major obstructions will be permitted within forty (40) feet of intersections. At the anticipated speeds, this distance will be sufficient to provide for the successful utilization of clear sight triangles.

The street standards proposed for Comotara are supported by studies conducted by the Urban Land Institute, the American Society of Civil Engineers, and the National Association of Home Builders as well as various planning and engineering consultants. The Community Builders Handbook states:

"There is the tendency in many municipalities to require excessive widths for minor single family residential streets. This is reflected in a similar tendency to require excessive roadway pavements. The Council is of the opinion that minor street rights-of-way in residential neighborhoods of single family detached houses should not exceed 50 feet with roadways not greater than 26 feet... the 26-foot pavement width is sufficient for slow moving, two-way traffic and for one lane of parallel curb parking. Remember, the primary function of the minor residential street is that of access to abutting property and not for traffic movement as such... The 26-foot width allows adequate space for car movement in backing out of individual driveways with five-foot radii."*

Cost Comparisons

The reduction of conventional street widths has been found to be particularly warranted in planned communities, like Comotara.

"Opportunities exist in planned communities to develop a network of streets based upon known and controllable conditions that offer increases in efficiency, appearance and economy beyond strict application of typical subdivision controls."** A roadway criteria study of the new town, Columbia, Maryland stated: "In planned communities where the density and development is predetermined, it is hot necessary or desirable to provide excessive width for right-of-way since widening for future development is not required.

* Community Builders Handbook, Community Builders Council of Urban Land Institute, Wash., D.C. 1968, pp. 146 & 147.

** Traffic Design of Streets in Planned Cluster Communities, Alan M. Voorhees & Assoc., Inc., Nov. 1968.

COMOTARA STREET COMPARISONS

Type	Right-of-Way	Travel Lanes	Parking or Shoulders	Total Pavement	Estimated Cost	
					Construction[1]	Maintenance[2]
Collector Street						
Current	70 ft.	2-12'	2-8'	40 ft.	$ 46/l.f.	$ 5.10/l.f.
Proposed	70 ft.	2-12'	2-4'	32 ft.	35/l.f.	4.70/l.f.
Loop Street						
Current	64 ft.	2-9'	2-8'	34 ft.	38/l.f.	$ 4.40/l.f.
Proposed	60 ft.	2-10'	1-8'	28 ft.	32/l.f.	3.70/l.f.
Cul-de-Sac						
Current	60 ft.	2-9'	2-8'	34 ft.	38/l.f.	$ 4.40/l.f.
Proposed	50 ft.	2-9'	1-8'	26 ft.	30/l.f.	3.50/l.f.

1 Construction costs are based upon current area costs and methods and do not include costs for storm sewers (approximately $ 14 l.f.), swales (approximately $11 l.f.), or sidewalks (approximately $10 l.f.) for collector streets.

2 Maintenance costs are based upon current city costs for the a) replacement or repair of surface pavement, curbs, storm sewers and drainage swales and b) the yearly maintenance (mechanical sweeping and mowing). Replacement costs assume the following lifetimes: a) surfacing and curb and gutter = 30 years; b) resurfacing = 10 years; c) repavement = 60 years; d) swales = 10 years.

Sidewalk Standards

According to Wichita's subdivision regulations, sidewalks are required on both sides of the street. It is proposed that the standard be improved so that 1) no sidewalks are placed along collector streets, and 2) one 4' sidewalk is required along loop, cul-de-sac, eye-brow, and private drive streets and additional 4 or 6', pedestrian and bike paths through dedicated open space to provide an inter-connecting network as shown in figures R-12 and R-13.

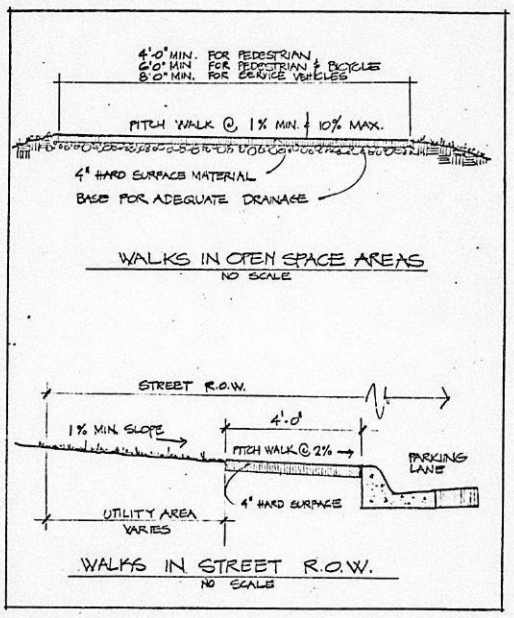
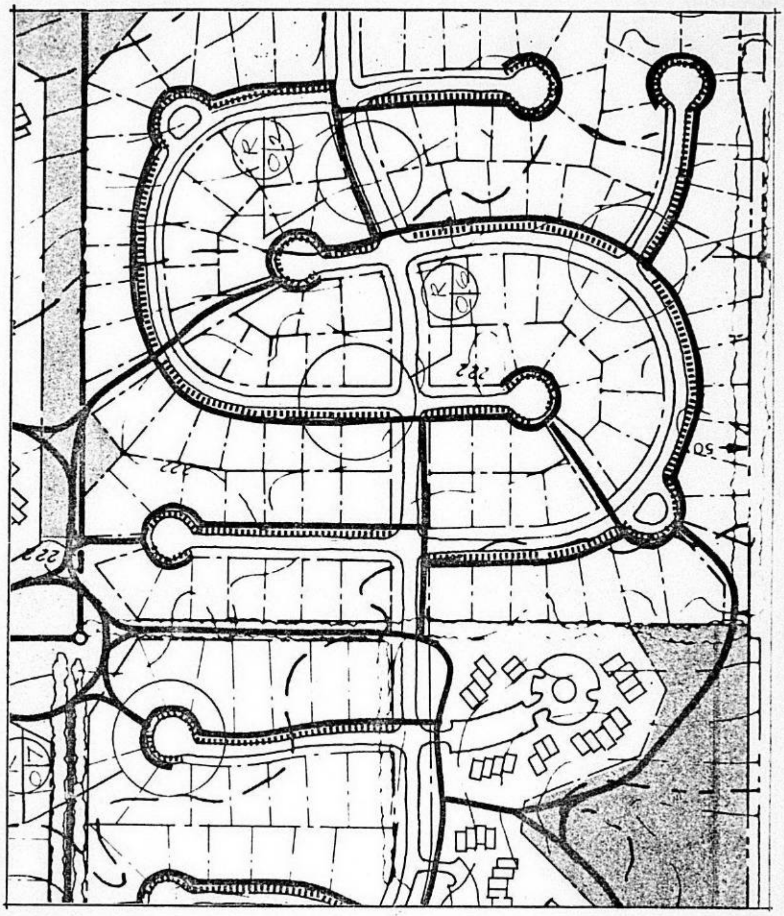


Figure R-12. Typical Sidewalk Sections



SIDEWALK
STREET PARKING
OPEN SPACE

DETAIL: OPEN SPACE, PARKING & SIDEWALK LOCATION

JOB: COMOTARA

SC: 1" = 200'
DA:
DR: J.L

INDEX CODE: R 0 13

Sidewalks should offer a safe, efficient means for pedestrian movement. In general, a complete separation of vehicular and pedestrian circulation system is desirable for maximum safety. Comotara features a network of open space corridors which link all major pedestrian-oriented facilities of the site and provide a logical location for pedestrian as well as bicycle paths. The separation of auto and foot traffic possesses obvious safety advantages and offers increased amenity for the pedestrian and cyclist. Sidewalks along heavily traveled and/or high speed roads are especially dangerous and therefore sidewalks have been eliminated along collector roads. Sidewalks along residential streets may be necessary and desirable, but one sidewalk along residential accessways has been shown to be sufficient if alternate open space pathways are available.

The recent study of "Residential Streets" published jointly by the Urban Land Institute, the American Society of Civil Engineers, and the National Association of Home Builders says:

> "Realistic evaluation often will reveal sidewalks on one or both sides of a minor residential street will be superfluous. When children are anticipated and paved private driveways will not be installed, sidewalks should be installed on at least one side of the street... Sidewalks within the rights-of-way of short culs-de-sac or courts may produce insufficient benefit to justify the cost. The added edge maintenance such sidewalks entail may make them a greater liability than asset."

Curb and Gutter Standards

Wichita's subdivision regulations require curb and gutter along all roads. It is proposed that curb and gutter be used for loop, cul-de-sac, and eye-brow roads (generally where there is parallel parking), but that drainage swales replace curb and gutter along collector streets, and private drives, when topographic and soil conditions permit in order to reduce runoff velocities and downstream flooding.

Generally, curb and gutter is proposed to be limited to the following:

1. Along local residential streets where parking is permitted and/or topographic and/or lot size does not reasonably permit the use of drainage swales along streets.

2. Where topographic and/or soil conditions or improvements do not permit adequate overland surface flows along drainage swales.

3. Where soil and topographic conditions either restrict adequate runoff, or exceed scouring velocities as determined by the Soil Conservation Service's Engineering Field Manual or other accepted methods.

Right-of-way widths should be utilized whenever possible to recharge precipitation. By allowing storm water to draina cross a road shoulder and be collected in road swales, peak storm flows can be attenuated while percolation and evaporation can occur. Similarly, storm sewers should be replaced whenever possible by drainage swales that collect and convey runoff in a natural manner. This is particularly applicable to areas where an occasional drainage easement between lots can drain water from the street to the open space area beyond. In the absence of curbs, bollards can be effectively used where vehicles are required to be confined to the pavement. In locations where topographic and/or soil conditions prevent effective use of swales, curb and gutter should be used; however, they should be integrated with drainage swales where possible to reduce design loads on the storm water system.

Supporting documentation for the use of swales in lieu of curb and gutter are provided under the Drainage and Storm Water Management System.

DRAINAGE AND STORM WATER MANAGEMENT

Collection Network - City Requirements

The collection network includes both street drainage and lot drainage. The purpose is to drain streets and lots, conveying this drainage to the flood control network.

The current storm water policy of the city is to minimize flooding problems by non-structural and structural approaches.* The purpose of the first approach is to control the extent and duration of flooding by constructing protective works and drainage improvements. The purpose of the second approach is to adjust the use of land to existing and future flood problems (i.e., floodplain regulations).

Non-Structural Measures - In an attempt to establish guidelines with which to contain development within areas which are reasonably safe from flooding, the city has established the following floodplain requirements:

> "Within any area along any natural watercourse, no structure shall hereafter be created, constructed, enlarged, moved or structurally altered with the elevation of any habitable floor, including non-flood proofed basements lower than three feet above elevation of the highest flood of record or the 100-year frequency design flood determined by the Wichita-Sedgwick County Flood Control Office or by the United States Army Corps of Engineers."

The prime standard is based on the flood of record plus three feet. This is the criterion that is in current use in establishing the boundaries of new developments. This standard has been used to locate buildable areas within Comotara.

The Subdivision Regulations are also designed to control floodplain development. Section 7-103 imposes the following restrictions:

* Drainage Problems and Protection. Wichita-Sedgwick County Metropolitan Area Planning Department (1973).

1. No land subject to periodic flooding or the 100 year flood shall be subdivided for residential use or any other use which would beincompatible with such flooding.

2. The provisions of restriction number 1 shall not bar the approval of any subdivision if improvements meeting the standards and requirements of the Flood Control Office or other available published standards and requirements are provided.

Section 8-103 of the Regulations requires tht the subdivider of a proposed subdivision shall install or provide for the installation of curbs and gutters and street drainage facilities in accordance with the standards set by the City Engineer. Kansas law provides that subdivision regulations may require the subdivider to comply with the following:

1. Specified design standards for stream channel improvements or protective works.

2. Minimum allowable ground floor elevation of structures.

3. Dedication of easements or rights-of-way for stream channels and floodplains.

4. Installation of adequate storm sewers.*

Structural Measures - The city classifies the various measures that are available to control flooding as storm drainage and flood control improvements. Because Comotara is at the headwaters we are primarily concerned with the storm drainage including small open channels, curbing, inlets and storm sewers where they are necessary.

The City has established specific guidelines to be used for open channel flow. These standards apply to the drainage swales that are proposed along collector streets and the conveyance swales that are proposed within the open space network.

1. Open channels and drainage swales must be designed to accommodate the 100 year storm. A 100 year storm of 24 hour duration is equivalent to a rainfall of 7.8 inches per hour.

* K.S.A. 12-734, 1971 Supplement.

2. A proposed open channel network must be designed to accommodate a freeboard of three feet. In order to provide for this protection within the easement a proposed swale can be expected to be 4 to 5 feet deep with maximum side slopes of 4 to 1. The City has also established that the maximum grade for open channel flow cannot exceed 0.3% unless wash checks are provided.

3. Whenever swales are proposed to replace curbs and gutters along collector streets, the City requires that the 100 year storm runoff must be contained within the proposed right-of-way. In order to provide for complete protection the following guidelines have also been established:

   a. A minimum culvert pipe size of 18 inches in diameter should be provided at intersection crossings.

   b. A minimum cover of 6 inches should be provided between the culvert and the sub-base of the street.

   c. A standard 2' x 5' inlet should be provided at the intersection of local streets.

Proposed Drainage System

The storm water management system for Comotara has been designed to accommodate city standards whenever logical. In some cases swales along streets have been used to convey runoff instead of using curbs, gutters and piping networks. The proposed swales along collector streets are part of the drainage network and, as such, their use is consistent with the current concern for storm water management.

COMOTARA STORMWATER MANAGEMENT SYSTEM
DESCRIPTION

	DESCRIPTION	DRAINAGE PURPOSE
COLLECTION NETWORK		
1. Street Drainage	1. Curb & Gutter	Drainage of residential streets and front lots
	2. Storm Sewer	Convey significant amounts of runoff to flood system.
	3. Street Swale	Drainage of collector streets and back lots; Convey significant amounts of collected runoff to flood control network.
2. Lot Drainage	1. Collection Swales	Collection of drainage from individual lots and conveyance of collected runoff to flood control network.
FLOOD CONTROL NETWORK		
1. Conveyance Swales	1. Condition A, B, C.	Convey significant amounts of collected overland flow to detention ponds.
2. Ponds		Collect and detain the increase in stormwaters generated by the development.

This kind of solution applied to individual sites or developments has the cumulative effect of attenuating peak runoff and total runoff that must be accommodated in ponds. If this process is fully applied throughout a drainage basin, it would reduce the number and size of major facilities that would be required to protect against flood hazards.* In order to ensure that these swales are properly designed to accommodate the peak flows that can be expected to occur, the following specific standards have been used.

* A Manual of Residential Storm Water Management (and Revised Edition). National Assoc. of Home Builders, (Maryland; 1973, 1975).

1. Drainage swales will be designed to accommodate the 100 year storm of a duration equivalent to the overland flow. In most cases this storm is equivalent to a rainfall of 6.5 to 7.8 inches per hour.

2. The runoff from the contributary drainage area will be accommodated within the collector street right-of-way of 70 feet.

3. That runoff from and along streets be carried by grass swales or standard curb and gutter at minimal grades of 1-2%, and discharged into conveyance swales.

4. The street drainage not be allowed to cross local street intersections.

5. That storm sewers be used only where conditions require and be designed for a minimum number of inlets and pipes.

6. That surface runoff from rear yards of single family residences be collected by swales and discharged into a surface conveyance system.

7. That surface runoff from multi-family areas be collected in swales and/or storm sewers and discharged into conveyance swales or ponds.

8. That swales be designed to carry runoff within each drainage area according to existing topographic, soil and cover conditions and the natural character of the site.

9. Side slopes on drainage swales will not exceed 4 to 1 ratios.

10. At intersection crossings an arch or squashed culvert that is equivalent to at least an 18 inch diameter round pipe will be provided. A standard city inlet of 3.5 feet and a minimum cover over the culvert of at least 6 inches in addition to road base will be provided.

These standards have been applied to two typical drainage conditions along the collector roads. Figure D-4 indicates the typical layout and capacity for these conditions. Figure D-5 indicates a typical drainage area within which these conditions apply. The figure also indicates the calculated amounts of peak runoff that are expected to occur at representative points within the area after full development.

Two variations from standard city procedures exist for the proposed swales along the collector streets. First, in order to accommodate the use of standard City inlets that will collect water from the local residential streets a greater swale depth will be necessary. Therefore, an additional transition easement of 10 to 15 feet is necessary along each side of the right-of-way. This easement will not be used to convey storm water but may be used for the location of utilities. Second, in order to provide for proper drainage of the swale a grade of 1% to 2% has been proposed. These grades have been designed to within the limits of scouring velocities for the involved soils and the characteristics of the proposed vegetation. The local Soil Conservation Service has confirmed this design standard (see Appendix).

Conveyance of runoff from collection swales and storm sewer to detention/retention ponds by overland flow can best be accomplished through the use of gently sloped grass swales. These conveyance swales are an important part of the flood control network proposed for Comotara's stormwater management system as they assist not only in directing runoff but also in controlling runoff peaks, velocities and concentrations.

The swales can be readily maintained as grass areas within easements or the open space system as summarized in the chart below and detailed in the Appendix, Figures D-6 and D-7. They will also assist in the control of erosion and sedimentation if constructed according to the design criteria established in the design standards table.

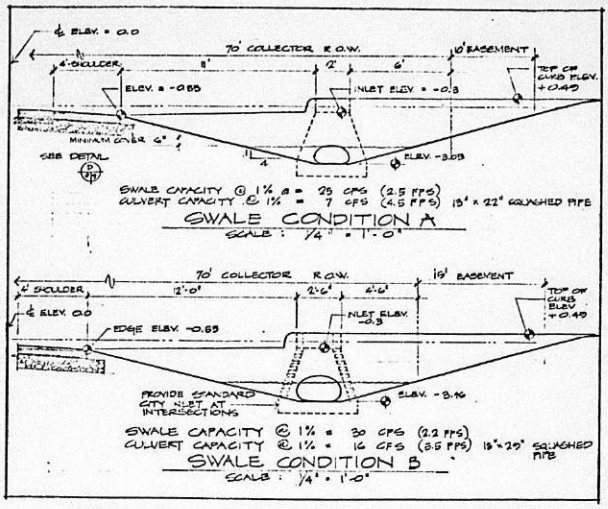


Figure D-4. Typical Collector Street Swale

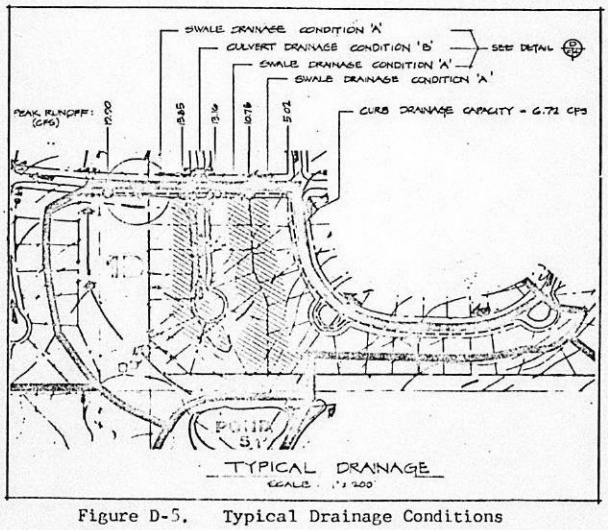
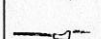
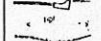
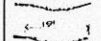
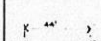
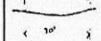
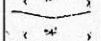


Figure D-5. Typical Drainage Conditions

COMOTARA STORMWATER MANAGEMENT DESIGN STANDARDS

	DESIGN FREQUENCY	DESIGN SECTION	DESIGN CAPACITY 1% SLOPE	DESIGN CAPACITY 2% SLOPE	R.O.W. OR EASEMENT
COLLECTION NETWORK					
1. CURB AND GUTTER	5 year		6.7 cfs (4.0 fps)	8.4 cfs (5.0 fps)	Within Street R.O.W.
2. COLLECTOR STREET SWALE A	100 year		25.0 cfs (2.5 fps)	n.a.	Within Street R.O.W.
3. COLLECTOR STREET SWALE B	100 year		30.0 cfs (2.2 fps)	n.a.	Within Street R.O.W.
FLOOD CONTROL NETWORK					
1. CONVEYANCE SWALE A	100 year		100 cfs	n.a.	44 ft.
2. CONVEYANCE SWALE B	100 year		200 cfs	n.a.	70 ft.
3. CONVEYANCE SWALE C	100 year		300 cfs	n.a.	84 ft.
4. DETENTION PONDS	100 year		(*)	(*)	n.a.

(*) Ponds are designed to accommodate the temporary storage of increased peak runoff from a 100-year, 24-hour duration storm of 7.8 inches per hour. Ponds will have a minimum depth of 5 feet for permanent storage and sufficient capacity to accommodate sediment of 0.05 feet per acre.

COMOTARA RUNOFF CALCULATIONS

DRAINAGE AREA		EXISTING CONDITION RUNOFF		DEVELOPED CONDITION RUNOFF		INCREASED RUNOFF		SEDIMENT	PERMANENT POND STORAGE		TEMPORARY POND STORAGE	
NO.	SIZE (ac.)	VOL. (ac.ft)	PEAK (cfs)	VOL. (ac.ft)	PEAK (cfs)	VOL. (ac.ft)	PEAK (cfs)	(ac.ft.)	SURFACE (ac.)	ELEV.	SURFACE (ac.)	ELEV.
1A	67.1	31.0	180	33.9	210	2.9	30	3.4				
1B	50.0	23.1	145	23.3	145	.2	0	2.5				
1C	30.0	13.9	105	14.7	120	.8	17	1.5				
1D	17.1	7.9	70	8.5	85	.6	15	.9				
Total	164.2					4.5		8.3	2.0	174+	2.5	176+
2A	55.7	25.8	155	30.8	185	5.1	30	2.8				
2B	79.2	36.6	200	38.7	240	2.1	40	4.0				
2C	85.6	39.6	210	45.4	310	5.8	100	4.3				
Total	220.5					13.0		11.1	3.0	182.5+	4.0	185+
3A	24.7	12.4	88	11.4	110	1.0	22	1.2				
3B	33.0	16.4	110	15.26	130	1.2	20	1.7				
3C	4.5	2.0	28	2.4	37	.3	9	.2				
Total	62.2					2.5		3.1	1.0	208+	1.5	210+
4A	40.7	18.8	140	20.4	170	1.6	30	2.0				
4B	24.0	11.1	90	11.9	110	.8	20	1.2				
Total	64.7					2.4		3.2	1.5	207.5+	2.0	209+
5A	12.6	5.8	55	6.8	62	1.0	7	.6				
5B	34.1	15.8	115	16.8	130	.8	15	1.7				
Total	46.7					1.8		2.3	1.0	204.5+	1.5	206+

General Notes: 1. Runoff for existing and developed conditions was determined by using the Soil Conservation Society Engineering Handbook. Volume of runoff and peak runoff was calculated for a 100 year storm of 24 hour duration (approximately 7.8 inches per hour).

2. The expected sediment load was calculated according to SCS methods using a sediment factor of .05 acre-feet per acre of developed land.

The use of swales as proposed for Comotara can reduce the number and size of major facilities that would be required to protect against flood hazards.* Adequate drainage systems must be a function of storm frequency, topographical conditions, soil conditions, and size of drainage area. Consideration should also be given to the increase in runoff under developed conditions and expected sedimentation. The Drainage System Comparison's table indicates the relative values and efficiencies of the various components of the stormwater management networks that can be achieved through the implementation of the proposed design standards.

COMOTARA DRAINAGE SYSTEM COMPARISONS

TYPE	PERVIOUSILITY FACTOR [a]	RUNOFF FACTORS [b]		PERCOLATION POTENTIAL [c]	EVAPORATION POTENTIAL [c]	EROSION CONTROL [d]	SEDIMENTATION CONTROL [e]	COST FACTORS [f]	
		CONCENTRATION	VELOCITY					CONSTRUCTION	MAINTENANCE
Street Swales	80	Min.	Min.	Mod.-slight	Slight	Mod.	Mod.	Min.	Mod.-slight
Curb & Gutter	98	Increases	Increases	Min.	Min.	Max.	Min.	Mod.	Min.
Collection Swales	80	Min.	Min.	Mod.	Mod.	Mod.	Mod.	Min.	Min.
Conveyance Swales	80	Mod.	Min.	Slight	Slight	Mod.	Mod.	Min.	Mod.-slight
Storm Sewer	100	Max.	Increases	Min.	Min.	Max.	Min.	Max.	Min.
Ponds	-	Controls	Controls	Max.	Max.	Max.	Max.	Mod.	Mod.

a Cover number denoting imperviousness of cover i.e. the greater the number the less permeable or more impervious the surface.
b Runoff concentrations and velocities are increased as imperviousness increases.
c Percolation and evaporative potential decreases as imperviousness increases.
d Erosion potential is minimized if velocities of 3-4 fps are not exceeded, however, erosion potential is increased at outfall points of curb and gutter and storm sewers.
e Natural drainage systems increase sedimentation control if erosion potential is minimized.
f Natural drainage systems reduce costs over "hardware" systems as noted in Street Comparisons table.

* A Manual of Residential Storm Water Management, National Assoc. of Home Builders, Md. (1975).

Flood Control Network

In addition to a collection network, a peak runoff and flood control network is necessary to accommodate major storms. The current storm water policy is to provide for major storm flows by floodplain zoning. In this case the floodway is defined as the flood of record plus three feet. It is proposed that improvements be made to exceed the city's design standards to permit:

1. That detention ponds be designed to detain and control increased storm water runoff based on a 100 year storm frequency of 24 hour duration and an intensity of 7.8 inches per hour.

2. That retention ponds be designed and constructed to provide for sediment storage and a minimum average permanent pool water depth of 5 feet, and/or adequate flood storage capacity as determined by the Soil Conservation Service's Engineering Field Manual or other accepted methods. Figure D-8 is typical of the standards proposed for this type of solution.

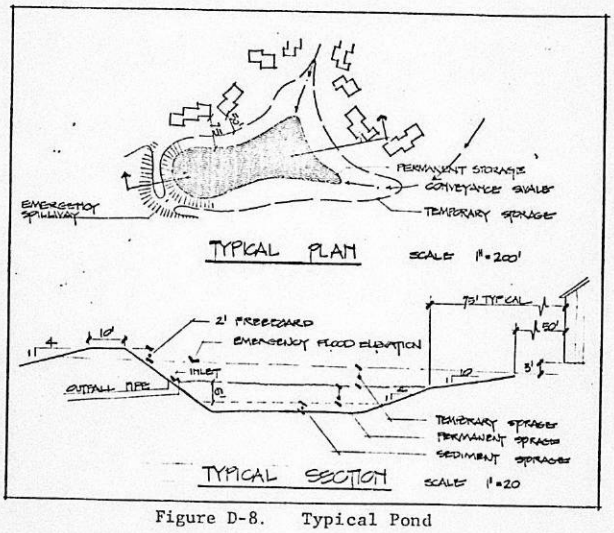


Figure D-8. Typical Pond

A flood control network should, of course, protect area residents from the hazards of flooding as does the Comotara design. But whenever possible it should also contribute to ecological balance by promoting local recharging of the underground water table, maximize municipal cost efficiencies, and augment local visual amenities. The proposed approach for Comotara provides, where conditions permit, for the detention and/or retention of collected storm water on the site, thereby preventing appreciable increases in the peak discharge of surface runoff from the site. Detention ponds, as shown in the typical detail above, serve to reduce the velocity of peak runoff while retention ponds provide for flood and peak storm runoff storage. Detailed runoff calculations and calculations for permanent and temporary pond storage have been made for Comotara as detailed for Sections B and C in the preceding Runoff Calculations chart.

The use of a detention/retention pond system is supported by the recommendations found in Urban Storm Drainage Criteria Manual, Volumes I and II, by Wright-McLaughlin Engineers for the Denver Regional Council of Governments, 1969; Water Pollution Control Federation Manual of Practice No. 9, Design and Construction of Sanitary and Storm Sewers, 1970; Research Report on Municipal Services for Residential Subdivisions, Ontario Canada Housing Advisory Committee, 1972; and A Manual of Residential Storm Water Management Development Standards, National Association of Home Builders, 1973. The above studies also strongly support the concept of two storm water management systems, a convenience system for minor storms and a flood system for major storms, as proposed for Comotara.

CHAPTER 4

RECOMMENDED P.U.D. PROCEDURES

A. PUD: Code Outline

In order to fulfill the concept of Comotara over the years, it will take to plan and construct, a very real need is seen for flexible, performance based legislation. This will enable not only the developers of Comotara but also the City to enact and implement the many technological and design changes and advances that occur over time. PUD is that type of legislation which permits flexibility and innovation but within a well-structured method of evaluating performance. The following is a recommended code outline based on the existing state enabling legislation.

1. Prior to final submission of a tentative plan for review and public hearing the communities, shall, with the developer hold informal meeting(s) to determine the applicability, scope and nature of the proposed development. In order to make rational determinations the City should require the developer to submit the following information.

   a. Proposed Site Information Requirements

      1) Location of the site.
      2) The size of the site.
      3) Current utilization of land adjacent to the site.
      4) Buildings existing on the site.
         a) Developer's intention regarding these buildings.
            (1) Retain
            (2) Demolish
            (3) If retained - future use.

   b. Proposed Developer Information Requirements

      1) Ownership of site.
         a) Explanation of the developers interest in the site detailing the type of property interest held.

2) Existing mortgages, liens, and judgments.
   a) Developer shall propose a method of notifying all parties having interest in the intent to file a Tentative Plan.

3) Developer Experience
   a) Developer shall submit information of his (its) personal experience in real estate development.
   b) The developer shall demonstrate successful experience involving development comparable to that proposed for any one year of development schedule.

4) Developer's financial capability.
   a) Current financial position.
   b) Sources of credit.
   c) Capability to acquire sufficient funds to complete site development.

c. Proposed Development - Minimum Statistical Requirements

1) Proposed development schedule to include:
   a) Number of housing units to be constructed.
   b) Duration of building time.
   c) Projection of demand with method of calculation with data sources.
   d) Service capacities.

2) Construction type and mix:
   a) Type of construction proposed.
   b) Projected mix of housing units by type.
   c) Conformance to building and housing codes.

3) Non-Residential land uses:
   a) By type in acres.
   b) Proposed construction schedule.

4) Roads and utilities:
   a) Identification of the existing roads and utilities are to connect into the proposed development.
   b) What is to be provided by developer by use and location.

d. Site Analysis Requirements

1) Topographical map of site at 10' intervals.

2) Soils/geology map of the site based upon Soils Conservation Service data. Showing at least seasonal and permanent wetlands, floodplains, erodable soils and prime aquifers.
   a) The following reports:
      (1) Analysis of natural limitations affecting site.
      (2) Detailed population and economic characteristics.
      (3) Traffic impact evaluation.
      (4) Utilities impact evaluation.
      (5) Storm drainage impact evaluation.
      (6) Common open space evaluation.
      (7) Development schedule report.

3) Detailed Site Development Submission Requirements
   a) Utility map showing proposed:
      (1) Location of sewer interceptors with a diameter of 6" or more.
      (2) Location of pumping stations and all force mains.
      (3) Location of common sewage treatment facilities of any type.
      (4) Location of major water transmission lines.
      (5) Location of all other existing and proposed pipelines and transmission lines showing easements.
      (6) Cross-section of typical common service trenches showing easement dimensions and placement of utility lines.

   b) Open space and community facilities map:
      (1) All lands to be dedicated or deed restricted for public or common use showing area acreage, major trails, proposed use and proposed ownership and maintenance vehicle.

(2) Location of all recreational facilities indicating type and general area of concentrated use and improvements.
(3) Location of all land to be dedicated to or buildings intended for community, educational or institutional use indicating building coverage in square feet.
(4) Location of private open space intended for use by the residents of a particular building.
(5) Location of all existing buildings, historical areas, and scenic areas to be preserved.
(6) Listing of the number by type of the following facilities:
    (a) Ballfields (baseball, football, soccer).
    (b) Basketball and tennis courts.
    (c) Park pavillion and/or shelter.
    (d) Picnic grounds.
    (e) Ponds and/or lakes.
    (f) Swimming and/or sprinkle or wading pools.
    (g) Tot-lots.
    (h) Special activity centers such as day care, etc.

c) Land coverage and drainage map:
(1) All areas of the site to be covered by paving or building roofs shall be identified, with the amount of area in square feet and the proportion of each as related to the total site, should be indicated.
(2) All areas of the site in which the natural vegetative cover will be substantially altered, with the square footage indicated.
(3) All natural drainage swales, all streams and their off-site watershed shall be identified with the maximum area that would be covered by water resulting from rainfall of a 15 year storm both before and after development.

(4) All improvements including retention basins, ponds, culverts, dams, storm water pipes in excess of 6" shall be located by type.

(5) A cross-section of the following shall be included and referenced.
   (a) Dams
   (b) Typical roadside swale
   (c) Typical curb and gutter (if required)
   (d) Natural drainage swale involving a depression of 12" or more.

d) Land use and other data map:
   (1) The submission shall show the location of the following land use categories as applicable.
      (a) Residential-Single family detached.
      (b) Residential-Single family semi-detached or attached (twin or townhouse).
      (c) Residential-Multi-family (garden apts. - quadraplex).
      (d) Residential-Multi-family (mid or high-rise).

4) Vegetation and special features map showing:
   a) All woodlands.
   b) Individual or group tree masses with caliper over 8".
   c) Rock outcroppings or unusual subsurface conditions.
   d) Existing buildings.
   e) Roads and trails.
   f) Flowing streams, drainageways, sands and lakes.
   g) Historically and archeologically significant areas.

5) Site limitations defined by the service capacities (peak hour) of:
   a) Roads
   b) Sanitary sewage disposal facilities.
   c) Public water facilities.
   d) Storm sewer or natural drainage systems.
   e) Schools.
   f) Host communities' financial capabilities.

e. As a Result of these Submissions and the related Informal Meeting(s) the City will be in a Position to Develop Criteria on which to Evaluate the Proposed Development. These criteria should be:

1) Classification of land.
2) Use intensity ranges.
3) Road capacities.
4) Public water capacities.
5) Sanitary sewage disposal capacities.
6) Proposed site improvements and their evaluation.
7) Financial impacts.

f. Outline of Tentative Plan Submission Requirements

1) These submissions should include:
   a) All submissions required for informal meetings.
   b) Regional location map.
   c) Land classification map.
   d) Road and parking map.
   e) Detailed utilities map.
   f) Detailed open space and community facilities map.
   g) Detailed land coverage and drainage map.
   h) Detailed land use map.
   i) Topographic map at 5' intervals (maximum).
   j) Commercial-designate type (regional, neighborhood, etc.).
   k) Industrial (by type) and Office.
   l) Community facilities - common open space.
   m) Community facility - public ground and/or facility.
   n) The number of housing units proposed within each residential land use category to be shown as a fraction above the number of acres occupied by the land use. For other uses the projected number of persons to occupy the area at peak hour.

o) The name of the proposed development and all identification symbols such as logos, street or other identification signs and indication all such symbols, etc., conform to sign regulations.

p) The names of all areas, community facilities, development sections and roads.

2) Projected demographic data:
   a) Total population (total and by stage).
   b) Population of each development section.
   c) Population of dwelling unit type.
   d) School age children by dwelling unit type.

3) Projected financial structure:
   a) Tax revenue generated for (total and by stage).
      (1) City of Wichita.
      (2) All affected school districts.
   b) Costs of municipal services resulting from projected development (total and by stage).
      (1) Municipal services by category, based on per capita unit delineating operational and capital expenditures.
      (2) School costs based on per student unit delineating operational and capital expenditures.

g. As a Result of these Submissions the City will be able to Evaluate the Proposed Development and Determine the following:

1) The quality of proposed development.
2) Allowable densities.
3) Required improvements.
4) Estimated costs of improvements.
5) Render a decision on the Tentative Plan.
   a) Approval as submitted
   b) Approval with condition(s)
   c) Denial

h. Definitive Plan Submission

1) The following graphic submission for each Station @ 1" = 50'.
   a) Survey map
   b) Building and paved coverage map
   c) Utility map
   d) Building quality exhibit
   e) Open space map
   f) Any other graphic presentations required by the Township.

2) The following reports to be submitted.
   a) Comparison to tentative plan
   b) Street and lot identification
   c) Development schedule
   d) Construction description
   e) Building code variation (if applicable)
   f) Utility agreements
   g) Any other report submissions deemed essential by the Townships.

3) The following legal documentation required:
   a) Easements and covenants
   b) Common open space maintenance agreements
   c) Dedication offer(s)
   d) Performance assurance
   e) Deed restricted open space

i. As a Result of these Submissions the City will be able to Evaluate the Proposed Development and Determine the following:

1) Approval of definitive plan (or phase thereof).

2) Deny approval of definitive plan (or phase thereof).

B. PUD: Evaluative Standards

During the review of the draft PUD Code of the City of Wichita several points came to the fore. First, refers to general procedures which is more fully covered in the previous section. Also it was found that certain voids existing in the area of establishing Evaluative Standards by which the City could judge the potential effect of a given proposal and evaluate the effects in terms of service requirements. The following represents certain types of criteria that should be received from a developer. The standards are national in character and for greater accuracy should be fine tuned for local validity.

1. Overall the structure of the proposed ordinance presents a good framework for codifying complex legislative approach. It clearly promotes much better land use management techniques in the greater Wichita area. Realizing this was a preliminary draft, the following suggestions, based upon our experience in this area, are offered for consideration to help achieve the goals outlined.

   a. Procedural Organization
   We have found that the method of structuring the flow of a Planned Unit Development application is very important to efficiently achieve the results desired. It has been our experience that by carefully structuring the flow of an application through the review and decision-making process the results for both the developer and the community are more equitable and manageable. Therefore we suggest the following comments for consideration:

      1) Enumerate and define the review and approval procedures. For example a three step procedure such as the following could be used.

         a) Preliminary Review - A general definition of the proposed PUD to be submitted by the applicant. This would provide the community (Planning Commission and staff) with a general overview of the project, its general conformance to the requirements and guidelines of the ordinance. This procedure

could be either at a formal or an informal level. This is particularly important for large scale projects so that piecemeal representation is not encouraged while at the same time reasonable product expectation is outlined for large acreage applications.

b) Tentative Review - A specific application submission containing all necessary and required data to document the scope and purpose of the project. This procedure will be formal where all rules and regulations would apply. Definitive reviews and findings of fact would be required as well as a formal approval or denial decision. This establishes agreed standards of performance and agreed land use commitments for the life of the project.

c) Final Review - A specific application for final approval on all or a defined portion of the Planned Unit Development. The purpose of this review is to determine conformance to the tentatively approved plan and specific design review. This is a check on conformance to agreed uses and performances before each section building permits are issued.

2) Enumerate and define the data to be required from the applicant at each step of the review procedure. We suggest that such items as follows be considered.
   a) Standard sheet sizes.
   b) Standard scale requirements.
   c) Type of data and in what format is to be provided for each requested submission and for each review procedure.

b. Required Minimum Size for a PUD
Although we recognize there are substantial amounts of open land in the Wichita area, it has been our experience that much better land use management techniques can be realized even with smaller parcels of land if encouraged to develop with the PUD concept. We have found that even well planned and executed parcels of 40-50 acres developed as a PUD do provide advantages to the community and to the developer. We would suggest smaller units of land be considered for PUD processing. Or perhaps, minimum sizing of PUD could be based upon the types of land uses contemplated. For example, multi-use i.e. industrial and/or major commercial coupled with residential development or various combinations of the above could serve as the basis for size determination.

c. Determination of Land Use Intensity
We agree that it is necessary to establish methods and techniques to determine land use intensity. We have found that total land coverage (i.e. the total area covered by structures and impervious cover) be expressed in perhaps two ways. First, expressed as a percentage of the total site that may be covered. Second, in a multi-use zone it could be possible to define the percent coverage in each use area, however, the total coverage shall not exceed the total permitted coverage for the site. In addition we see residential intensity being expressed in terms of dwelling units per acre and required open space requirements. This method is particularly useful in controlling drainage and runoff problems as well as effectively eliminating over building of sites.

d. Modification of Street and Sidewalk Standards
We concur that this type of flexibility should be included in these regulations. However, we would suggest that guidelines be established to evaluate the implementation standards as they relate to function and design so that the conditions of application review are not so open ended. We have found this to considerably reduce administration and negotiations.

2. Suggestions Related to Specific Items in the Legislation

a. Standards for evaluation suggested herein are in some cases national in nature and in others regional in nature. We would suggest that these standards be examined in terms of Wichita and its local conditions.

b. Section 28.04.194(B)(c) - Open Space - Recreational Land Requirement. This requirement should reflect the composition of the proposed community and should contain a minimum requirement coupled with evaluative criteria structured to permit open space calculation. Further, the components of open space-recreational uses should be defined in terms of common and private lands to be maintained as such.

1) Minimum total site area to be devoted to common open space - 20%.

2) Standards for residential uses:
(a) 1000 sq.ft./resident.
(b) Residents by unit type (regional variations possible). See Item 6 for generation standards.

3) Standards for industrial/commercial uses: An area equivalent to 33% of the area.

c. Section 28.04.194(D) - We suggest that intensity be a function of residential density, open space requirements and total amount of impervious cover. Suggested standards for maximum impervious cover:

Land Use Type	Size of Lot	% Coverage*
Single Family Detached	1 acre	10%
Single Family Detached	½ acre	12%
Single Family Detached	1/3 acre	15%
Single Family Detached	¼ acre	20%
Single Family Detached	1/5 acre	25%
Duplex	7200 s.f./unit	20%
Triplex	--	30%
Quadplex	--	35%
Single Family Attached (TH) (Condominium Owner)		
Building Only	Size of Unit	100%
Lot Deed Out	6200 s.f.	50%

Multi-Family Apt. Units		
2 Stories	--	25%
3 Stories	--	30%
Shopping Centers	--	--
Regional	--	50%
Community	--	40%
Neighborhood	--	35%
Office/Commercial	--	60%
Industrial	--	67%

d. Section 28.04.194(E) - Off-Street parking requirments for residential land uses appears to be low.

1) Single family attached - 3 spaces/unit
2) Single family attached - 2 spaces/unit if less than 4 bedroom.
3) Multi-family (apartments) - 2 spaces/unit if 1 bedroom or greater.

e. Section 28.04.194(J)(b) - It is suggested that street and sidewalk modifications have guidelines within which modifications can occur. Since Wichita is a metropolitan center with extra-territorial powers, the guidelines should provide enough flexibility to adapt from the urban to the suburban environments that are apt to occur in the area. Suggested guidelines:

1) If a development is urban in character.
   a) Pedestrian systems will generally follow normal standards.
   b) Separation of pedestrian and vehicular traffic should be considered along major collector streets and arterial streets, i.e. optional.
   c) Street design standard would normally follow present definitions and design characteristics.

2) If a development is suburban in character, pedestrian systems should begin to show some separation. General guidelines:
   a) Cul-de-sac and court - 0-100 ADT - sidewalks

b) Private access drive - 75-350 ADT - sidewalks optional
c) Loop streets - 200-1000 ADT - sidewalks optional
d) Collector streets - 800-3000 ADT - no sidewalks
e) Arterial streets - 2000+ ADT - no sidewalks.

3) Streets generally are classified on the basis of their design and capacity to move vehicles. The general method of placing pedestrian ways in the right-of-way evolved from streets serving developments primarily single family detached where no other land was available for sidewalks. Since PUDs do not follow this procedure, it is suggested that along the most heavily traveled streets, i.e. collectors and arterials, pedestrian and vehicular traffic be separated to reduce conflict and promote safety. Along other streets with lesser vehicular activity the placement of sidewalks would become optional and a function of the overall PUD design and how traffic separations can likely occur.

f. Section 28.04.199 - Application for Approval of a Planned Unit Development, Administration and Procedures. The following represents suggested submission data by which a proposed Planned Unit Development can be evaluated.

Suggested Preliminary Plan Submissions:

1) A regional locational map showing the site in relation to the surrounding community and important facilities.

2) A land restrictions map illustrating the lands unsuitable for development with notation for classification.

3) A roads and parking map showing:
a) All dedicated and non-dedicated roads, their classification; rights-of-way; cartway; location of sidewalks and paved paths; and a typical cross-section for each road classification.

b) All parking areas for more than five cars showing the number of spaces; landscaped areas within each area; and the use(s) intended to be served.

4) A utilities map showing the location of:
   a) All major waste water collection and disposal systems on the site.
   b) All water distribution mains, storage facilities, etc. on the site.
   c) All existing and proposed easements for gas transmission lines; power lines; telephone lines; and a cross-section of the service trench.

5) An open space and community facilities map showing:
   a) All lands dedicated or deed restricted for public or common use noting the number of acres and proposed use.
   b) The location of structures and facilities such as tot lots; playfields; swimming pools; court games; community facilities buildings; schools; churches or institutional buildings; ponds/lakes; etc.

6) A drainage map showing:
   a) Location of natural drainage swales; existing flowing streams; proposed water detention or impoundment sites; dams; culverts; pipes in excess of six inches; and other pertinent data.
   b) The legend shall contain a cross-section of the following: dam(s); typical roadside swale; typical curb and/or gutter; natural drainage swale involving a depression of 12 inches or more.

7) Topographic and natural features map showing:
   a) A topographic map at two-foot intervals.
   b) Existing vegetation.

c) Other significant natural features such as significant individual trees, rock outcroppings and the lake.

8) Land use map to show:
   a) Location and type of land uses.
   b) Number of housing units by type in each designated residential area.
   c) Type and size of each non-residential use area.

9) Supporting documentation: The application shall supply all supporting documentation for each of the above required submissions specifically addressing the anticipated generations resulting from the proposed PUD-D and the capacity of the City's natural, man-made and fiscal systems to absorb them.

g. Add to Section 28.04.199(a) Subsection (B) which will consist of a set of local standards by which an evaluation of a proposed PUD-D can occur.

In order to enable the reviewing agency to evaluate a PUD proposal in terms of its potential effect on the community it is suggested that standards be adopted for this purpose.

Suggested evaluative standards*:

1) Population Generation

Unit Type	Bedrooms	Persons	School Children
Single Family Detached	3	3.3	6
Single Family Detached	4	3.7	1.3
Townhouse	2	2.6	.2
Townhouse	3	3.3	.6
Townhouse	4	3.7	1.0
Low Rise Apartment	Studio	1.1	.01
Low Rise Apartment	1	1.9	.05
Low Rise Apartment	2	2.8	.3
High Rise Apartment	Studio	1.1	.01
High Rise Apartment	1	1.8	.01
High Rise Apartment	2	2.4	.2

2) Traffic Generation

Unit Type	Bedrooms	Peak Hour Trips
Single Family Detached	3	.82
Single Family Detached	4	.92
Townhouse	2	.72
Townhouse	3	.82
Townhouse	4	.92
Low Rise Apartment	Studio	.52
Low Rise Apartment	1	.62
Low Rise Apartment	2	.72
High Rise Apartment	Studio	.52
High Rise Apartment	1	.62
High Rise Apartment	2	.72
Neighborhood Commercial		7.9-11.8/1000 s.f.
Community Commercial		4.5-6.6/1000 s.f.
Regional Commercial		2.3-3.7/1000 s.f.
Office/Light Industrial		2.7-2.9/1000 s.f.

3) Waste Water Generation

Unit Type	Bedrooms	Gallons/Unit/Day
Single Family Detached	3	330
Single Family Detached	4	370
Townhouse	2	260
Townhouse	3	330
Townhouse	4	370
Low Rise Apartment	Studio	110
low Rise Apartment	1	190
Low Rise Apartment	2	280
High Rise Apartment	Studio	110
High Rise Apartment	1	180
High Rise Apartment	2	240
Industrial		Each type of non-residential will have its own characteristics and should be evaluated as such.

4) Water Consumption Demands

Unit Type	Bedrooms	Gallons/Unit/Day
Single Family Detached	3	330
Single Family Detached	4	370
Townhouse	2	260
Townhouse	3	330
Townhouse	4	370
Low Rise Apartment	Studio	110
Low Rise Apartment	1	190
Low Rise Apartment	2	280
High Rise Apartment	Studio	110
High Rise Apartment	1	180
High Rise Apartment	2	240
Industrial		Each type of non-residential use will have its own characteristics and should be evaluated as such.

5) Drainage and Storm Water Runoff Standards
   a) Express a clear standard (formula) for calculating storm water runoff (existing and change due to cover).
   b) Standards for retention/detention basins with storage for 25-year storm, freeboard for 100-year storm.

h. The reviewing agency, based upon the required submissions and evaluation standards, can be in a better position to judge the acceptibility of a PUD application.

Suggested findings by the reviewing agency.

1) Whether the plan as submitted meets the intent and purpose of a PUD as set forth in Section 28.04.193(A) and meets the goals of the Comprehensive Plan.

2) An evaluation of each submission requirement in terms of the potential positive and/or negative impacts resulting from the development.

3) An evaluation of the extent of any adverse impact in any of the areas prescribed. A statement of whether the applicant has substantiated how this negative impact(s) will be internalized and/or ameliorated.

4) Based upon these findings render a decision of approval, approval with condition(s), or denial.

* Standards are generally national in scope and regional adjustments can be made where applicable.

APPENDIX

Acknowledgements

Various officials and representatives of the City of Wichita, Sedgwick County, State of Kansas, and various consulting engineers have been contracted and have contributed information used in this Report and/or found in the supportive documents. We wish to acknowledge their kind assistance.

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The professionals of RAHENKAMP SACHS WELLS AND ASSOCIATES that have been responsible for and contributed to this report are also acknowledged.

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APPENDIX

The Comotara Plan

COMOTARA DEVELOPMENT DATA

RAHENKAMP SACHS WELLS AND ASSOCIATES
January 1975

	PHASE 2				PHASE 3				PHASE 4				PHASE 5				TOTALS			
	SF	M1	M2-3	TOTAL	SF	M1	M2-3	TOTAL	SF	M1	M2-3	TOTAL	SF	M1	M2-3	TOTAL	SF	M1	M2-3	TOTAL
LAND USES																				
Net Resid. Acres	12.8	5.1	6.8	24.7	28.1	16.8	13.3	58.2	21.7	16.5	6.0	43.7	30.7	5.5	10.5	46.7	93.3	43.4	36.6	173.3
Collector R.O.W.				5.7				5.2				4.5				3.3				18.7
Loop St. R.O.W.				2.1				4.9				1.9				3.8				12.7
Cul-de-Sac R.O.W.				1.7				2.2				3.5				3.3				10.7
Open Space Acres				29.7				29.2				18.2				15.7				92.8
Total Acreage				66.5				99.7				65.0				80.2				312.4
IMPACTS																				
Collector St. l.f				3534				3207				2813				2050				11604
Loop Streets l.f	1222 + 2 brows			1522	2976 + 4 brows			3576	1250 + 1 brow			1400	2492 + 2 brows			2792				9290
Culs-de-sac l.f.	998 + 3 bulbs			1448	1131 + 5 bulbs			1881	1662 + 8 bulbs 1 brow			3012	1795 + 7 bulbs			2845				9186
Sidewalks (l.f.)				11200				15800				16300				13500				56800
Building (units)	62	38	84	184	115	115	212	442	101	79	64	244	140	98	108	346	418	330	468	1216
IMPACTS																				
Traffic (adt)	744	304	504	1552	1380	920	1272	3572	1212	632	384	2228	1680	784	648	3112	5016	2640	2808	10464
Water (mpd)	.022	.009	.013	.044	.040	.026	.028	.094	.035	.027	.022	.084	.049	.034	.038	.121	.146	.115	.164	.425
Sewage (mgd)	.044	.017	.027	.088	.081	.052	.047	.188	.070	.054	.045	.169	.098	.069	.076	.243	.292	.231	.328	.851
Build.Cover(ac).	2.7	.5	1.0	4.2	5.0	1.6	1.6	8.2	4.4	1.1	.7	6.2	6.1	1.4	1.2	8.7	18.2	4.6	4.5	27.3
Impervious Cover % of gross (ac)				24%				21%				21%				22%				22%

SF - Single Family @ 3.5 du/ac over density; M1 - Multi-Family @ 7 du/ac over density; M2-3 Multi-Family @ 12 du/ac over density

APPENDIX

Supportive Documents

COMOTARA TRAFFIC GENERATION

RAHENKAMP SACHS WELLS AND ASSOCIATES
January 1975

TRAFFIC GENERATION AREA	SINGLE FAMILY [1]		MULTI-FAMILY-1 [2]		MULTI-FAMILY 2-3 [3]		TOTAL	
	UNITS	ADT	UNITS	ADT	UNITS	ADT	UNITS	ADT
B1	-	-	74	592	84	504	158	1096
B2	67	804	31	248	-	-	98	1052
B3	62	744	48	384	212	1272	322	2400
TOTAL B	129	1548	153	1224	296	1776	578	4548
C1	101	1212	-	-	-	-	101	1212
C2	-	-	123	984	172	1032	295	2016
TOTAL C1-C2	101	1212	123	984	172	1032	396	3228
C3	75	900	54	432	-	-	129	1332
C4	113	1356	-	-	-	-	113	1356
TOTAL C3-C4	188	2256	54	432	-	-	242	2688
TOTAL C	289	3468	177	1416	172	1032	638	5916
TOTAL B&C	418	5016	330	2640	468	2808	1216	10464

[1] @ 12 ADT per dwelling unit [2] @ 8 ADT per dwelling unit [3] @ 6 ADT per dwelling unit

RAHENKAMP SACHS WELLS AND ASSOCIATES INC
PLANNERS • LAND PLANNERS • LANDSCAPE ARCHITECTS

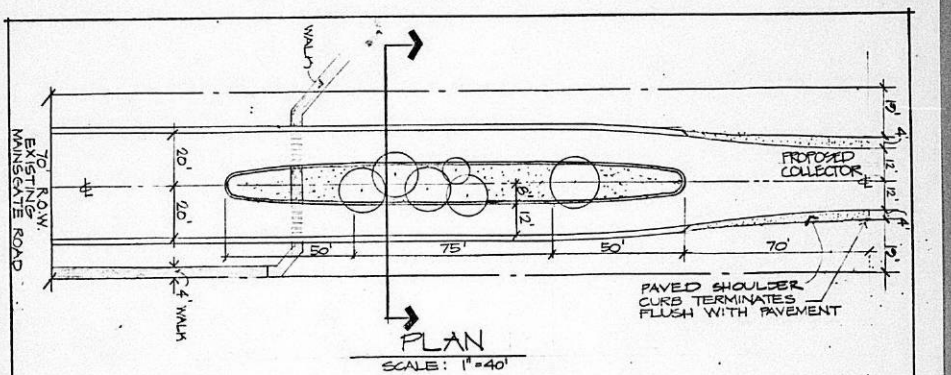
OSTERHOUT HOUSE
1317 SPRING GARDEN ST PHILADELPHIA PA 19130 215 108 2565
106 E ST ANDREWS DR MOORESTOWN NJ 08057 609 866 3323

DETAIL: TRANSITION CONDITION BETWEEN EXISTING MANNGATTE ROAD AND PROPOSED COLLECTOR

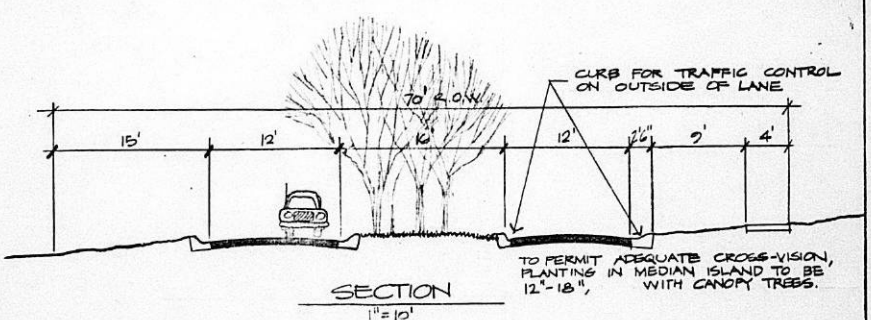
JOB: COMOTARA

INDEX CODE: R 03

SC: AS SHOWN
DA:
DR: JL.



PLAN
SCALE: 1"=40'



SECTION
1"=10'

RAHENKAMP SACHS WELLS AND ASSOCIATES INC
PLANNING • LAND PLANNERS • LANDSCAPE ARCHITECTS

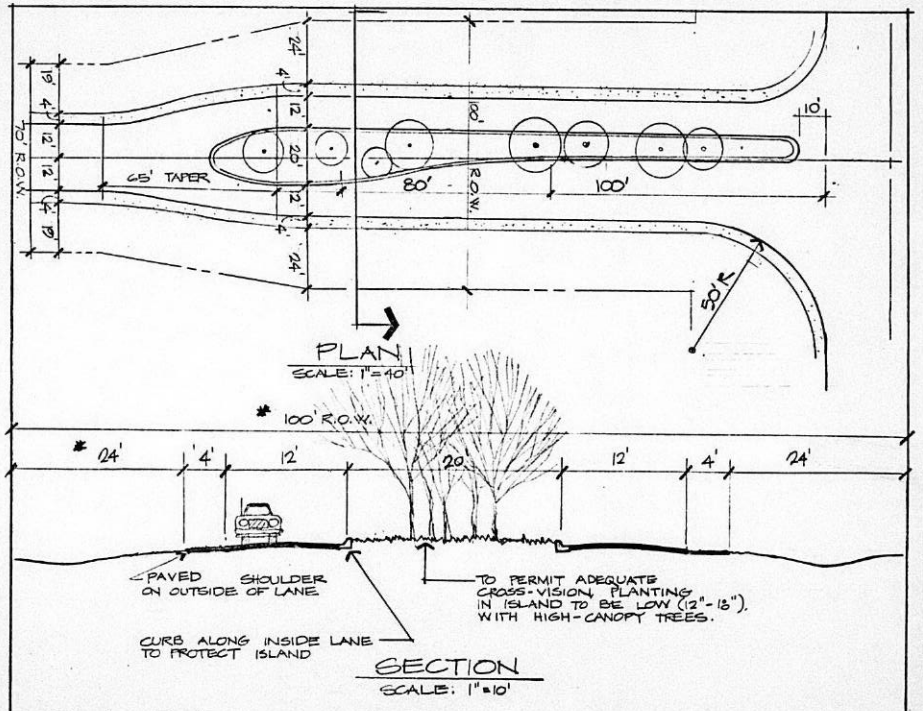
EATHERN HOUSE
1717 SPRING GARDEN ST PHILADELPHIA PA 19130 215 LOR 2345
146 E ST ANDREWS DR MOORESTOWN NJ 08057 609 MOR 3323

DETAIL: COLLECTOR DIVIDED ENTRANCE

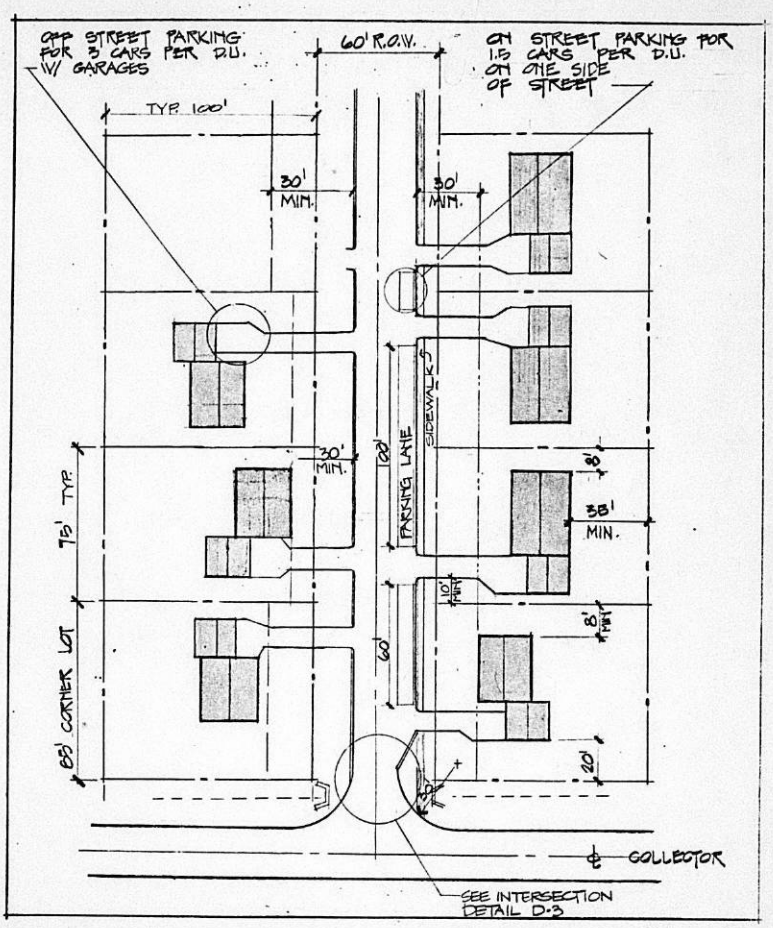
JOB: COMOTARA

INDEX CODE: R 04

SC: AS SHOWN
DA:
DR: JL/DS



* Drainage Section will dictate ROW



RAHENKAMP SACHS WELLS AND ASSOCIATES INC
PLANNERS • LAND PLANNERS • LANDSCAPE ARCHITECTS

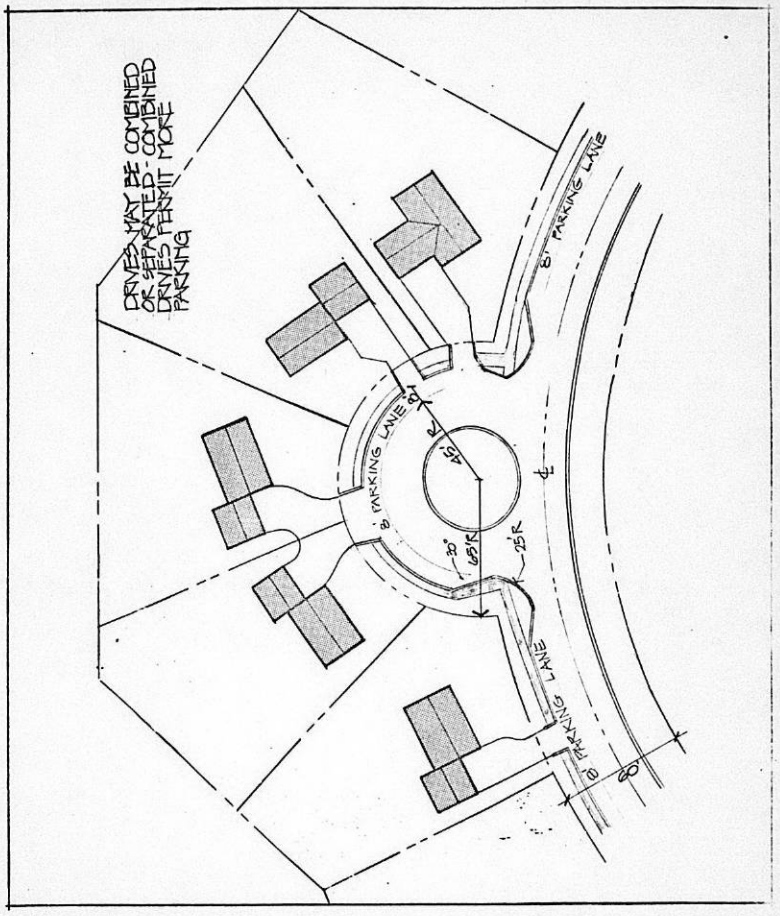
STETSON HOUSE
1717 SPRING GARDEN ST PHILADELPHIA PA 19130 215 LOB 7545
166 E ST ANDREWS DR MOORESTOWN NJ 08057 609 WO4 3323

DETAIL: TYPICAL LAYOUT - LOOP STREET

JOB: COMOTARA

SC: 1" = 30'
DA:
DR: M.S./DS.

INDEX CODE: R 05



RAHENKAMP SACHS WELLS AND ASSOCIATES INC
PLANNERS • LAND PLANNERS • LANDSCAPE ARCHITECTS

STETSON HOUSE
1717 SPRING GARDEN ST PHILADELPHIA PA 19130 215 LOB 7545
166 E ST ANDREWS DR MOORESTOWN NJ 08057 609 WO4 3323

DETAIL: TYPICAL LAYOUT EYEBROW

JOB: COMOTARA

SC: 1" = 50'
DA:
DR: M.S / D.S.

INDEX CODE: R 0 9

FIRE FIGHTING ACCESSIBILITY

The city provides for the access of fire fighting vehicles into residential areas by requiring that the following clearance width standards be followed:

a.	Normal residential streets	
	Total roadway (with parking and curbs)	34 feet
	Parking area (both sides)	-16 feet
	Available fire easement clearance	18-22 feet
b.	Private drives and streets	
	2-100 foot pieces of aerial equipment	14 feet
	Passing and clearance area	10 feet
	Required fire easement clearance	24 feet
	R.O.W. radius for culs-de-sac	50 feet
	Outside pavement radius for culs-de-sac	35 feet

The city does not encourage the design of center islands because of maintenance problems.

Although a wider clearance width is required for private drives and streets, the city has explained that the parking areas of normal residential streets could be used for fire access during emergency situations. These standards are not based on specific design or vehicle requirements.

State Highway Commission of Kansas

ROBERT B. DOCKING, Governor

A. J. "ANDY" GRAY, Director of Highways
JOHN IVAN, Assistant State Highway Director
GLEN D. McNEAL, State Highway Engineer

STATE HIGHWAY COMMISSIONERS
KEN PHELPS, Manhattan
CLARENCE L. KING, JR., Salina
RICHARD M. DRISCOLL, Russell
KARL A. BRUECK, Paola
NESTOR R. WEIGAND, JR., Wichita
LOUIS KAMPSCHROEDER, Garden City

STATE OFFICE BUILDING
TOPEKA, KANSAS 66612

June 7, 1974

Section 8-B
Wichita ATS

Mr. Dan Estraub
Rahenkamp, Sachs, Wells & Assoc.
1717 Spring Garden
Philadelphia, Pennsylvania 19130

Dear Mr. Estraub:

This is to confirm our telephone conversation on June 6, 1974 concerning the factors we used for the Wichita Urban Area in the Multiple Regression Analysis to determine trip generation equations.

The equations are:

A. HBW - P: $y = 13.3 + 1.44$ DU
B. HBW - A: $y = 2.1$ Comm $+ 0.4$ MAN $+ 0.1$ PQP (Zone 1-70)
$y = 1.1$ Comm $+ 0.4$ MAN $+ 0.1$ PQP (Zone 71-∞)
C. HBO - P: $y = 2.8$ DU
D. HBO - A: $y = 25.0 + 3.5$ Comm $+ 0.7$ DU $+ 0.3$ PQP (Zone 1-70)
$y = 25.0 + 2.5$ Comm $+ 0.7$ DU $+ 0.3$ PQP (Zone 71-∞)
E. NHB - TE: $y = -72.9 + 2.56$ DU
F. TRK - TE: $y = -30.0 + 3.1$ Comm (Zone 1-70)
$y = 25.0 + 1.01$ DU $+ 0.11$ Comm $+ 0.05$ MAN (Zone 71-∞)
G. EXT - A: $y = 0.11$ Comm $+ 0.04$ MAN $+ 0.20$ DU

DU = Dwelling Units
Comm = Commercial (Thousands of Square Feet)
MAN = Manufacturing (Thousands of Square Feet)
PQP = Public-Quasi-Public (Thousands of Square Feet)
HBW = Home Based Work - (P = Productions, A = Attractions)
HBO = Home Based Other - (Productions and Attractions)
NHB = Non Home Based - Trip Ends
TRK = Truck - Trip Ends
EXT = External - Attractions

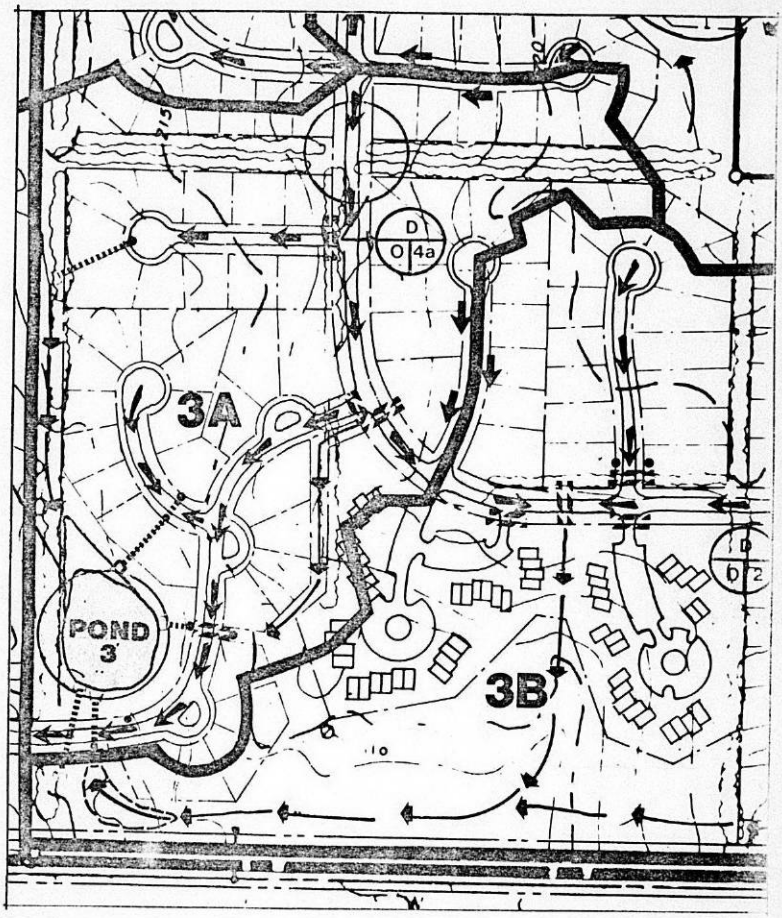
If you need anymore information, please do not hesitate to contact us.

Very truly yours,

VERNE L. CRAIG, P.E.
ENGINEER OF PLANNING AND DEVELOPMENT

E. D. LANDMAN, P.E.
Assistant Engineer of Planning and Development - Systems Planning

EDL/VC:db



3A DRAINAGE AREA DESIGNATION
DRAINAGE FLOW
6 STANDARD DETAIL KEY
STORM SEWER
CONVEYANCE SWALE
CULVERT AND INLET

DETAIL: DRAINAGE SYSTEMS

JOB: COMOTARA

INDEX CODE: D O 1

SC: 1" = 200'
DA: 1/31/75
DR: J.L.

RAHENKAMP SACHS WELLS AND ASSOCIATES INC
PLANNERS • LAND PLANNERS • LANDSCAPE ARCHITECTS

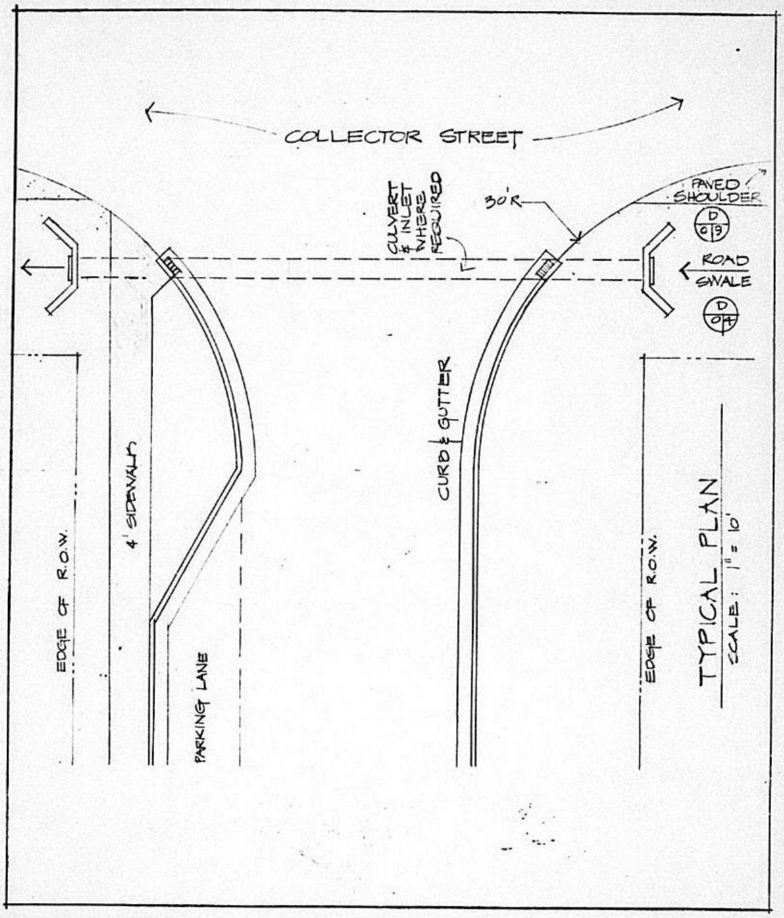
STETSON HOUSE
1717 SPRING GARDEN ST PHILADELPHIA PA 19130 215 LOB 7545
166 E ST ANDREWS DR MOORESTOWN NJ 08057 609 W04 3323

DETAIL: TYPICAL STREET DRAINAGE

JOB: COMOTARA

SC: AS SHOWN
DA:
DR: M.S.

INDEX CODE: D / 0 2



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STETSON HOUSE
1717 SPRING GARDEN ST PHILADELPHIA PA 19130 215 LO8 7545
166 E ST ANDREWS DR MOORESTOWN NJ 08057 609 WO4 3323

DETAIL: TYPICAL COLLECTOR INTERSECTION

JOB: COMOTARA

SC: 1" = 10'
DA:
DR: M.S./DS

INDEX CODE: D 0 3

RAHENKAMP SACHS WELLS AND ASSOCIATES INC
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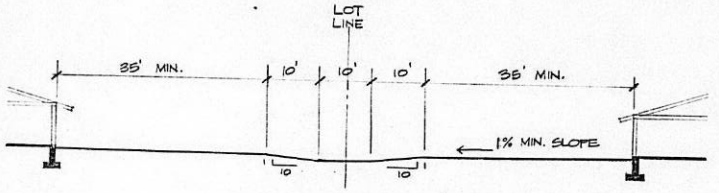
STETSON HOUSE
1317 SPRING GARDEN ST PHILADELPHIA PA 19130 215 LOR 2345
186 E ST ANDREWS DR MOUNTSTOWN NJ 08057 609 MOR 3323

DETAIL: TYPICAL COLLECTION AND CONVEYANCE SWALE

JOB: COMOTTARA

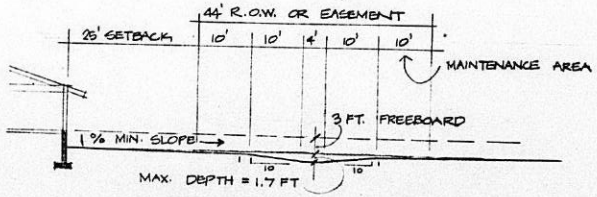
INDEX CODE: D 06

SC: 1" = 20'
DA:
DR: M.S./DS



TYPICAL COLLECTION SWALE
SCALE: 1" = 20'

NOTE: THIS SWALE HAS A MAXIMUM CAPACITY OF 100 C.F.S. AT 1% SLOPE AND A MAXIMUM DEPTH OF 1.7 FT.



TYPICAL CONVEYANCE SWALE - CONDITION A
SCALE: 1" = 20'

RAMEKAMP SACHS WELLS AND ASSOCIATES INC
PLANNERS • LAND PLANNERS • LANDSCAPE ARCHITECTS

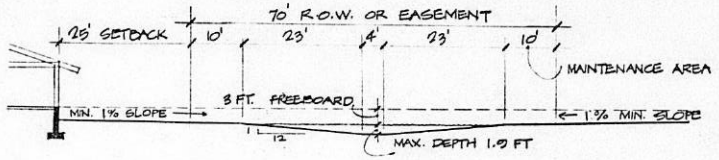
DETAIL: TYPICAL CONVEYANCE SWALE

JOB: DOMOTARA

INDEX CODE: D 07

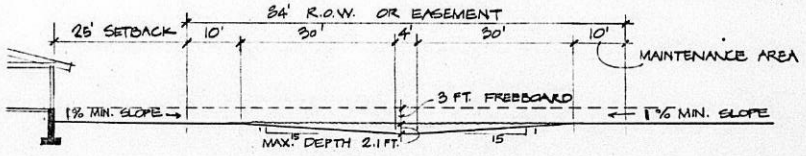
SC: 1" = 20'
DA: M.S./DS

NOTE: THIS SWALE HAS A MAXIMUM CAPACITY OF 200 C.F.S. @ 1% SLOPE, MAX. DEPTH 1.9 FT.



TYPICAL CONVEYANCE SWALE - CONDITION B
SCALE: 1" = 20'

NOTE: THIS SWALE HAS A MAXIMUM CAPACITY OF 300 C.F.S. @ 1% SLOPE AND MAXIMUM DEPTH OF 2.1 FT.



TYPICAL CONVEYANCE SWALE - CONDITION C
SCALE: 1" = 20'

RAHENKAMP SACHS WELLS AND ASSOCIATES INC
PLANNERS • LAND PLANNERS • LANDSCAPE ARCHITECTS

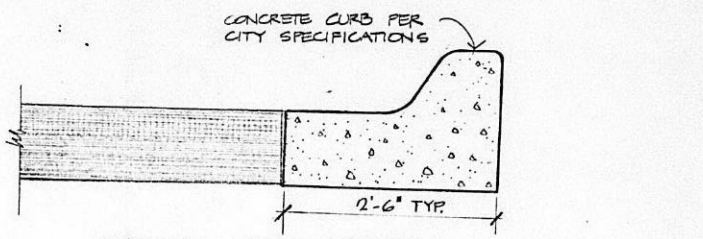
STETSON HOUSE
1717 SPRING GARDEN ST PHILADELPHIA PA 19130 215 LOB 7545
144 E ST ANDREWS DR MOORESTOWN NJ 08057 609 MOR 3223

DETAIL: CURB AND SHOULDER SECTIONS

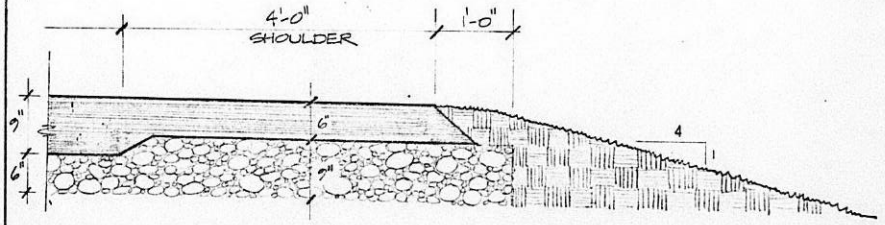
JOB: CONOTARA

INDEX CODE: D 09

SC: AS SHOWN
DA:
DR: MS



TYPICAL CURB DETAIL
SCALE: 1" = 1'-0"



TYPICAL PAVED SHOULDER
SCALE: 3/4" = 1'-0"

FLOOD CONTROL IN WICHITA

1. The delination of the area of record flood plus 3' is not an ordinance on state statutes, but rather a guide that can be adjusted as long as two demands are observed:

   a. That development and fill is restricted from the floodway (area of record flood established by the flood of 1960).

   b. That development in the area adjacent to the floodway and within a 3' elevation may occur only if the lowest floor elevation is to or above the level of the 100-year frequency flood, and together with attendant utility and sanitary facilities, to be floodproofed up to the level of the 100-year flood.

2. Allowable methods of permitting develoment in the freeboard (the area adjacent to the floodway and within a 3' elevation) include:

   a. Improving the drainage channel.

   b. Using fill to raise the floor elevation provided that the operation is outside the level of the 100-year flood.

3. The flood control office prefers that the drainage corridor be left in a natural state rather than channelized, and building development take place outside the floodway plus freeboard.

4. The area designated as the flood of record was established by flood marks left by the floods of July and August of 1960, at that date. The actual storm frequency was never established, nor can a 100-year frequency storm be established because there are no rainfall recording stations and no records by which to make comparisons.

5. The floodway and freeboard in the drainage basin occupied by Midwest Piper has not been established, but development, there too, would have to respect a 100-year frequency storm (plus some freeboard - not established as yet).

Conditions which effect the extent of freeboard include:

a. Size of channel

b. Condition of water escaping the channel, surmounting levees, etc.

c. Side drainage slopes.

d. Size of drainage basin.

6. Land management and use requirements as set down by the national flood insurance program are not clear at this time. Present conditions are solely applied on 100-year frequency storms on major streams. It is not known whether this applies to all feeder streams and the street drainage system. Mr. Mitchell feels that within 10 years time the latter two drainage areas would be included under the conditions set down by the flood insurance program.

7. No specific program exists for sediment and erosion control. The Department of Flood Control Maintenance recommends a 50-year design period for open channels plus 3 feet of freeboard. In addition, they require 15 feet of maintenance easement on each side of the channel and 4:1 side slopes. Therefore, a channel cross-section requires 30 feet easement plus 8 feet width for every foot of depth plus the channel bottom width. Any such channel improvements must be completed by the developer at his expense.

8. Retention ponds have not been widely used in Wichita because of the lack of retention capacity of most of the soils in the area. In addition, a dam permit from the State Department of Water Resources must be obtained before city approval can be obtained. The department of Flood Control Maintenance would accept SCS procedures to determine runoff for ponds but encourages the use of the Rational formula.

9. The high rainfall periods are in March, April, November and December, and the normal open channel conveyance swales can be designed for a 50-year design period with an additional freeboard of 3 feet. The city will require 4:1 side slopes on drainage channels or swales and at least 15 feet of access width for maintenance on both sides of the channel. This usually requires a right-of-way of 60 feet. All improvements on open channels are to be completed by the developer and may not be permitted by the city until the improvements necessary to accommodate the increased flows are completed downstream.

10. The city design standard is a storm frequency of 5 years for piping systems and a frequency of 100 years for overland flow. The actual duration is based on the time of concentration. In those areas where runoff is to be piped, the flood overflow can be accommodated within the street section but cannot be allowed to inundate any buildings.

RETENTION AND DETENTION PONDS

1. The surface soils in the Wichita area are clayey and loamy exhibiting an impervious character. Therefore, the runoff is moderate to rapid; and water and wind erosion is severe especially adjacent to drainageways and steeper slopes. The actual percolation rates vary from .03 to .06 inches per hour.

2. The existing ponds on the site were designed by SCS, built by landowner farmers and inspected by SCS. The main purpose of the ponds is to stop or detain storm waters. Typical design techniques were used and the ponds currently receive little maintenance except for the grass spillways.

3. In order to function as storm water control devices in an open space system, any ponds would be required to be designed as detention dams. As such they would reduce downstream flooding. The constraints on the Comotara site that must be recognized in designing ponds are the existence of Wellington shale approximately 2 to 6 below surface, and the existence of only 2 to 3 feet of this shale within the rippable category.

4. According to state law any ponds or dams built in areas of high risk must be designed according to more stringent specifications. High risk areas are defined as adjacent to major roads or adjacent to residential development.

SWALE DESIGN

Problem Statement

1. What is the capacity of a trapezoidal swale with a bottom dimension (b) of 2', side slopes (z) equal to 4:1, and depth (d) of 1'?

2. Design two trapezoidal swales to carry 100 and 300 cfs at a slope of 1%.

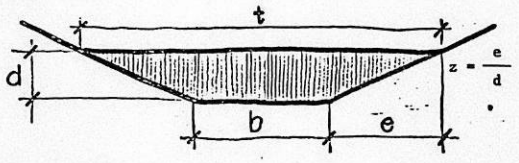
Results

1. The capacity of a swale with the above dimensions is 20.9 cfs. However, within a 15' R.O.W. this allows 2.5 feet on either side of the swale. Therefore, in order to use the same side slope (or at least not greater) the difference in elevation between the bottom of swale and the edge of the road can only be 1.625' (1' depth in the swale + .625' freeboard).

2. The following table lists the flows and design parameters of the swales to provide the given capacities:

Flows(cfs)	Depth(d)	Side Slopes(z)	Bottom Dimension(b)	Top Dimension(t)
300	2.1'	15:1	4'	67'
100	1.7'	6:1	4'	24.4'

where



Note: These dimensions do not include the maintenance area required by the city.

SWALE VEGETATION

Vegetation for use in swale system, sediment storage, and slopes for swale sidewalls.

1. Two grasses are considered desirable for use in the swale system for Comotara. They are Bermudagrass and a Fescue known as Kentucky 31.

   a. Bermudagrass is the more erosion resistant cover. It is a warm season grass which in the Wichita area will require some maintenance. It may appear brown during winter months.

   b. Kentucky 31 is less erosion resistant. It is a cool season grass which should only experience browning during extreme drought periods. 31 tends to grow in clumps; however, this can be overcome by approximately doubling the seed application rate. It is also true that the thicker it is planted, the shorter it grows. It will also result in a cost saving (as compared with Bermudagrass) of about $15 per acre. However, this is probably negligible.

   c. Both grasses require nitrogen fertilization once a year. Both should be kept mowed at about 3 to 3½ inches.

   d. The best time for planting is after the first good rain in late August: August 15 to September 15. Kentucky 31 should be established before the first frost, whereas Bermudagrass will be completely established by the following year.

   e. It appears that both grasses should be considered at this point although Bermudagrass, due to its increased erosion resistance, is most likely.

2. No sediment storage is required in the ponds because no significant sediment production is anticipated.

3. Both vegetation types are suitable for use on 6:1 side slopes in the swales. The maximum slope they can be used on is 3:1. A better grass for the 3:1 condition, in terms of erosion resistance, is Bromegrass. However, it is not as erosion resistant as Bermudagrass as it scours more readily, is a coarse grass which is best maintained at 6" (it can be cut to 3" provided it is allowed to grow back to 6"), giving it a good "long-view" appearance. Nonetheless it is used extensively in waterways in Kansas.

In summary, Bermudagrass is the best grass in terms of maximum flow conditions. However, it is slightly more expensive in planting and maintenance. Where side slopes of 3:1 are necessary, Bromegrass is more desirable although less appealing and will reduce the flow capacity in the swale relative to Bermudagrass. Thus, the order of grasses to be used where they are feasible should be 1) Kentucky 31, 2) Bermudagrass, and 3) Bromegrass.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

4100 Maple
Wichita, Kansas 67209
316 943 9471

March 15, 1975

Mr. Iain Robertson
1717 Spring Garden Street
Philadelphia, PA 19130

Dear Mr. Robertson:

Enclosed is a copy of the information that you requested from our handbooks on velocities. Our soils in the Wichita area definitely fall under the easily eroded category on the table and I feel that this table is fairly lenient in the minimum velocity it lists for various grasses. I feel that 3 feet per second on all grasses except Bermudagrass, and not over 4 feet per second on Bermudagrass, is a good rule to follow.

If I can be of further help to you, feel free to contact me.

Sincerely,

Larry L. Henry
District Conservationist

Cover	Slope range 2/ (percent)	Permissible velocity 1/	
		Erosion resistant soils (ft.per sec.)	Easily eroded soils (ft.per sec.)
Bermudagrass	0-5 5-10 over 10	8 7 6	6 5 4
Bahia Buffalograss Kentucky bluegrass Smooth brome Blue grama Tall fescue	0-5 5-10 over 10	7 6 5	5 4 3
Grass mixtures Reed canarygrass	2/ 0-5 5-10	5 4	4 3
Lespedeza sericea Weeping lovegrass Yellow bluestem Redtop Alfalfa Red fescue	3/ 0-5	3.5	2.5
Common lespedeza 4/ Sudangrass 4/	5/ 0-5	3.5	2.5

1/ Use velocities exceeding 5 feet per second only where good covers and proper maintenance can be obtained.

2/ Do not use on slopes steeper than 10 percent except for vegetated side slopes in combination with a stone, concrete, or highly resistant vegetative center section.

3/ Do not use on slopes steeper than 5 percent except for vegetated side slopes in combination with a stone, concrete, or highly resistant vegetative center section.

4/ Annuals--use on mild slopes or as temporary protection until permanent covers are established.

5/ Use on slopes steeper than 5 percent is not recommended.

Exhibit 7-3. Permissible velocities for channels lined with vegetation

Retardance	Cover	Condition
A	Reed canarygrass	Excellent stand, tall (average 36 inches)
	Yellow bluestem Ischaemum	Excellent stand, tall (average 36 inches)
B	Smooth bromegrass	Good stand, mowed (average 12 to 15 inches)
	Bermudagrass	Good stand, tall (average 12 inches)
	Native grass mixture (little bluestem, blue grama, and other long and short midwest grasses)	Good stand, unmowed
	Tall fescue	Good stand, unmowed (average 18 inches)
	Lespedeza sericea	Good stand, not woody, tall (average 19 inches)
	Grass-legume mixture--Timothy, smooth bromegrass, or orchard grass	Good stand, uncut (average 20 inches)
	Reed canarygrass	Good stand, mowed (average 12 to 15 inches)
	Tall fescue, with bird's foot trefoil or lodino	Good stand, uncut (average 18 inches)
	Blue grama	Good stand, uncut (average 13 inches)
C	Bahia	Good stand, uncut (6 to 8 inches)
	Bermudagrass	Good stand, mowed (average 6 inches)
	Redtop	Good stand, headed (15 to 20 inches)
	Grass-legume mixture--summer (Orchard grass, redtop, Italian ryegrass, and common lespedeza)	Good stand, uncut (6 to 8 inches)
	Centipedegrass	Very dense cover (average 6 inches)
	Kentucky bluegrass	Good stand, headed (6 to 12 inches)
D	Bermudagrass	Good stand, cut to 2.5-inch height
	Red fescue	Good stand, headed (12 to 18 inches)
	Buffalograss	Good stand, uncut (3 to 6 inches)
	Grass-legume mixture--fall, spring (Orchard grass, redtop, Italian ryegrass, and common lespedeza).	Good stand, uncut (4 to 5 inches)
	Lespedeza sericea	After cutting to 2-inch height. Very good stand before cutting
E	Bermudagrass	Good stand, cut to 1.5-inch height.
	Bermudagrass	Burned stubble.

Exhibit 7-2. Classification of vegetation cover as to degree of retardance.

COMOTARA

rahenkamp sachs wells & associates

RECOMMENDED C.U.P. DESIGN STANDARDS

COMOTARA

OWNER:

WICHITA LAND COMPANY
2500 CLAIBORN CIRCLE
WICHITA, KANSAS 67226

LAND PLANNERS:

RAHENKAMP SACHS WELLS AND ASSOCIATES
1717 SPRING GARDEN STREET
PHILADELPHIA, PENNSYLVANIA 19130

DATE:

APRIL, 1975

COMOTARA

April 24, 1975

Wichita-Sedgwick County
Metropolitan Area Planning Commission
104 South Main Street
Wichita, Kansas 67202

Gentlemen:

We are pleased to submit for your review the proposed Design Standards for Sections B and C of Comotara, as part of the Community Unit Plan Submission. Standards are given for street design, drainage, and stormwater management. We feel these standards serve to implement the design concepts of Comotara with efficiency and economy.

Very truly yours,

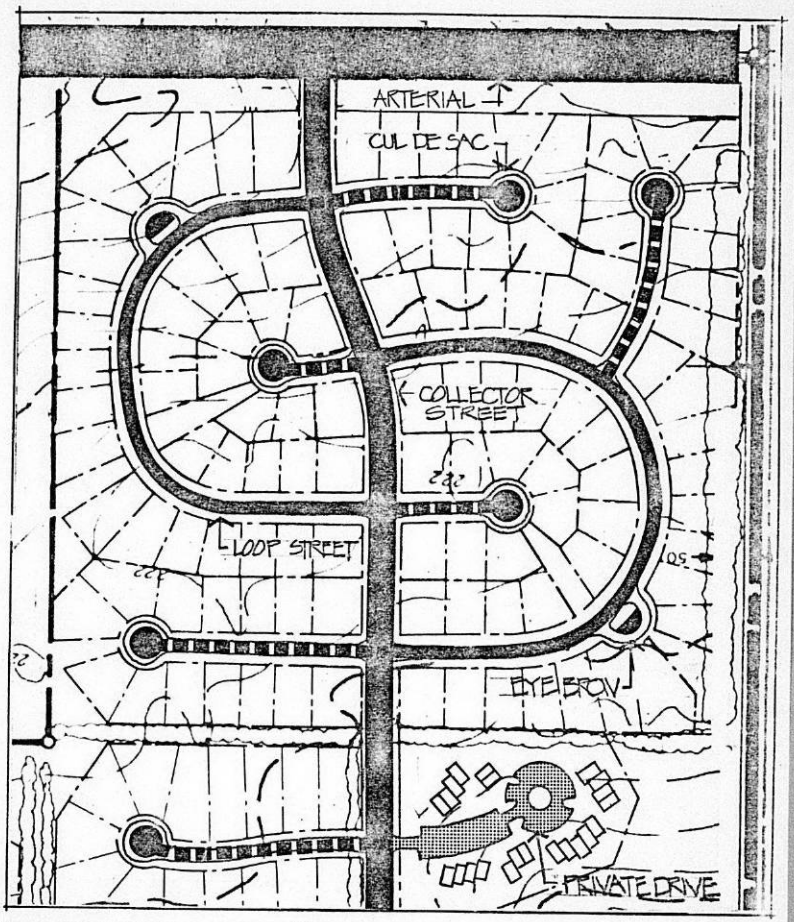
WICHITA LAND COMPANY

RECOMMENDED C.U.P. DESIGN STANDARDS

The preceding chapters have given a general overview of the Comotara master plan and recommended legislation. Essential to making such a plan a reality is giving close attention to the details of planning, design and construction. That the City of Wichita, too, attaches importance to design details as a means of attaining safe, efficient, technically-sound and high-quality neighborhoods, is evidenced by the design standards contained in the Subdivision Regulations.

STREET AND CIRCULATION SYSTEM

Street widths are a function of probable traffic volumes, parking needs and controls, probable vehicle speeds, limitations imposed by terrain, and maintenance needs. The minimum width which will reasonably satisfy these elements should be selected. Any reduction in pavement width will reduce both construction costs and future maintenance and resurfacing costs. Narrower pavements also mean less impervious cover with the consequent reduction of peak storm flows and concentration of water. Reduction of bituminous paving and impervious cover will also increase the possibility of percolating storm runoff into the ground water table. (See discussion of storm water systems.) Figure R-1 outlines the proposed hierarchical street system that will be used throughout Comotara.



COLLECTOR
LOOP STREET
CUL DE SAC
EYEBROW
PRIVATE DRIVE

DETAIL: ROAD/STREET CLASSIFICATION

JOB: COMOTARA

SC: 1" = 200'
DA:
DR: DS

INDEX CODE: R 0 1

Street Width Standards

The following chart outlines the recommended street standards for a project such as Comotara reviewed under CUP legislation.

Three new street types are also proposed: divided collector, eye-brow and private drive. These proposed street width standards are as follows:

Type	Right-of-way	Travel Lanes	Parking/ Shoulder	Total Pavement[1]
Collector Street				
Current	70'	2-12'	2-8'	40'
Proposed	70'	2-12'	2-4'	32'
Loop Street				
Current	64'	2-9'	2-8'	34'
Proposed	60'	2-11'	1-8'	30'
Cul-de-sac				
Current	60'	2-9'	2-8'	34'
Proposed	60'	2-11'	1-8'	30'
New Street Types:				
Divided Collector	100'	2-12'	2-4'	32'
Eye-brow	130'dia.	2-11'	1-8'	30'
Private Drive	--	2-10'	None*	20'

1) Measurements are face of curb to face of curb, including 2' for each curb and gutter.

* Parking bays provided.

A description of each street type with typical detail follows:

1. Collector and Divided Collector streets are designed to convey vehicles from local streets to arterials. Parking along these streets will not be necessary since they provide for through circulation only and will have no direct driveway access. Therefore, these streets should consist of two travel lanes and sufficient shoulders to accommodate disabled vehicles.

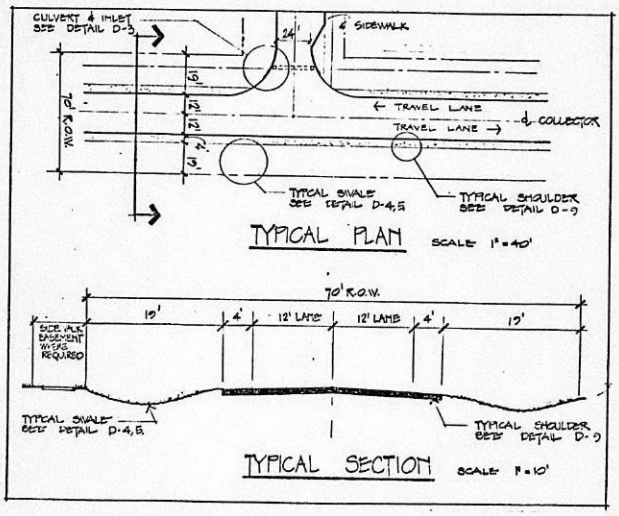


Figure R-2. Typical Collector Street

2. Loop streets are designed to collect traffic from culs-de-sac and private drives and convey this traffic to the collector streets. These streets may accommodate limited over-flow parking, and therefore one parking lane is recommended.

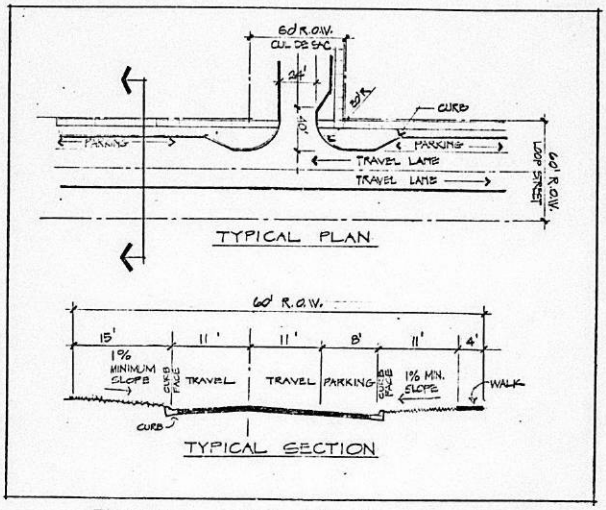


Figure R-6. Typical Section: Loop Street

3. Culs-de-sac are designed to provide direct access to individual single family lots. Because these streets do not permit through traffic and may be used for over-flow parking, one parking lane is necessary with two travel lanes. Special topographical considerations may require slightly greater lengths than the subdivision regulation of 600 feet, but never more than permits adequate fire fighting access.

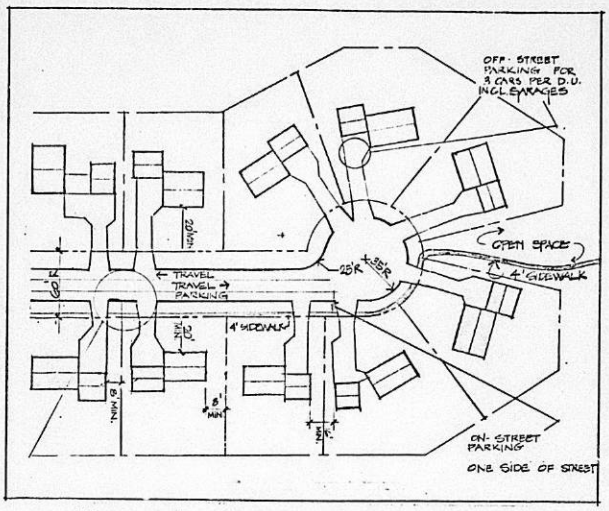


Figure R-7. Typical Layout of Cul-de-sac

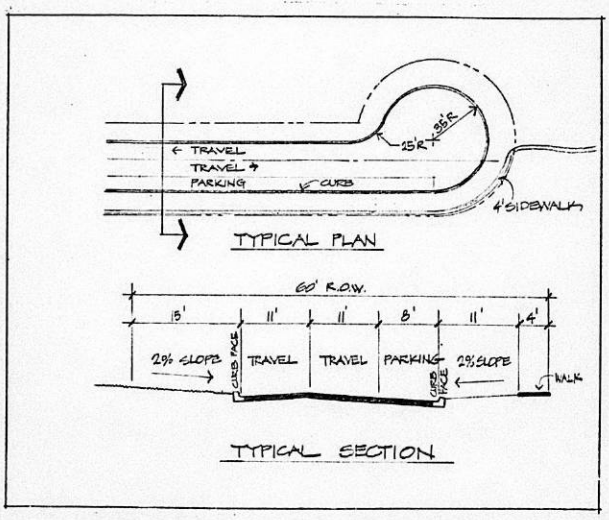


Figure R-8. Typical Section: Cul-de-sac

4. Eye-brow are designed to provide direct access to clusters of not more than six units off loop streets. The general standards for culs-de-sac should apply.

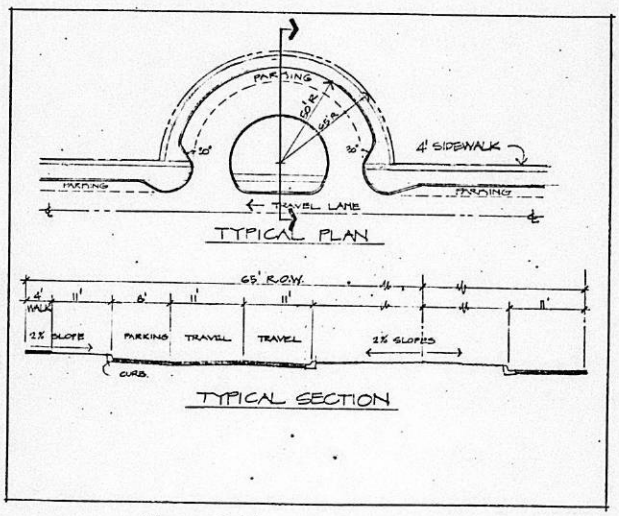


Figure R-10. Typical Eyebrow

5. Private drives are designed to provide direct access to multi-family housing. These streets do not encourage through traffic and are not dedicated. The use of curbing or parking lanes is not generally necessary as sufficient parking is located in off-street areas adjacent to each dwelling unit.

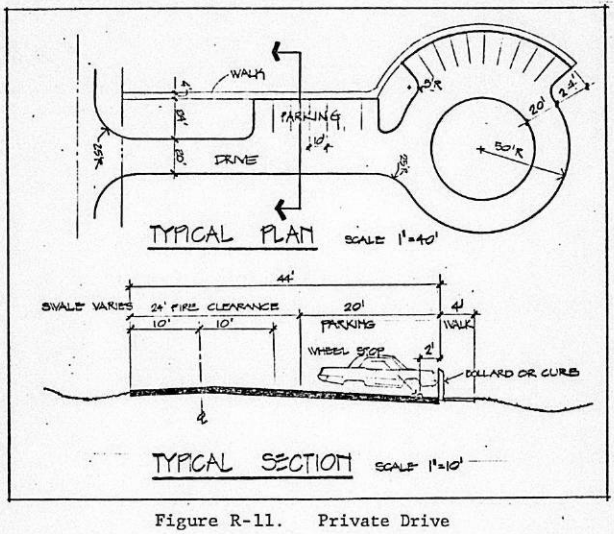


Figure R-11. Private Drive

The following design criteria served as a basis for the proposed street standards:

Type	Design Speed	Capacity (ADT)
Divided Collector	30+	1500 - 5000
Collector	30+	1500 - 5000
Loop	25	250 - 2000
Cul-de-Sac	25 or less	0 - 250
Eye-Brow	25 or less	0 - 250
Private Drive	25 or less	0 - 250

The reduction in street widths is achieved primarily through the provision of parking lanes only where they are necessary for safety. According to the subdivision regulations at least 3 off-street parking spaces per dwelling unit must be provided for local low-density residential streets without parking lanes. The parking design standards proposed for Comotara would accommodate not only 3 off-street parking spaces per dwelling unit but also an additional 1.5 on-street parking spaces per dwelling unit (see Appendix, Figures R-5, 7 and 9). One parking lane, using a special curbing technique to control one-side parking, thus provides more than adequate parking facilities. Since the main purpose of collector streets is to convey traffic to arterial roads, on-street parking is not necessary for collector roadways, and should be prohibited to provide safer free flowing traffic movement. All roads are wide enough to provide required fire fighting clearance (see Appendix), especially with the provision of additional 4 foot clearance on private drives.

Because street intersections increase the possibility of vehicular or pedestrian accidents special consideration has been given to these areas. In order to accommodate the clear sight distances at intersections, no parking or major obstructions will be permitted within forty (40) feet of intersections. At the anticipated speeds, this distance will be sufficient to provide for the successful utilization of clear sight triangles.

The street standards proposed for Comotara are supported by studies conducted by the Urban Land Institute, the American Society of Civil Engineers, and the National Association of Home Builders as well as various planning and engineering consultants. The Community Builders Handbook states:

"There is the tendency in many municipalities to require excessive widths for minor single family residential streets. This is reflected in a similar tendency to require excessive roadway pavements. The Council is of the opinion that minor street rights-of-way in residential neighborhoods of single family detached houses should not exceed 50 feet with roadways not greater than 26 feet... the 26-foot pavement width is sufficient for slow moving, two-way traffic and for one lane of parallel curb parking. Remember, the primary function of the minor residential street is that of access to abutting property and not for traffic movement as such... The 26-foot width allows adequate space for car movement in backing out of individual driveways with five-foot radii."*

Cost Comparisons

The reduction of conventional street widths has been found to be particularly warranted in planned communities, like Comotara.

"Opportunities exist in planned communities to develop a network of streets based upon known and controllable conditions that offer increases in efficiency, appearance and economy beyond strict application of typical subdivision controls."** A roadway criteria study of the new town, Columbia, Maryland stated: "In planned communities where the density and development is predetermined, it is not necessary or desirable to provide excessive width for right-of-way since widening for future development is not required.

* Community Builders Handbook, Community Builders Council of Urban Land Institute, Wash., D.C. 1968, pp. 146 & 147.

** Traffic Design of Streets in Planned Cluster Communities, Alan M. Voorhees & Assoc., Inc., Nov. 1968.

COMOTARA STREET COMPARISONS

Type	Right-of-Way	Travel Lanes	Parking or Shoulders	Total Pavement *	Estimated Cost	
					Construction[1]	Maintenance[2]
Collector Street						
Current	70 ft.	2-12'	2-8'	40 ft.	$ 46/l.f.	$ 5.10/l.f.
Proposed	70 ft.	2-12'	2-4'	32 ft.	33/l.f.	4.70/l.f.
Loop Street						
Current	64 ft.	2-9'	2-8'	34 ft.	38/l.f.	$ 4.40/l.f.
Proposed	60 ft.	2-11'	1-8'	30 ft.	35/l.f.	3.76/l.f.
Cul-de-Sac						
Current	60 ft.	2-9'	2-8'	34 ft.	38/l.f.	$ 4.40/l.f.
Proposed	60 ft.	2-11'	1-8'	30 ft.	32/l.f.	3.50/l.f.

[1] Construction costs are based upon current area costs and methods and do not include costs for storm sewers (approximately $ 14 l.f.), swales (approximately $11 l.f.), or sidewalks (approximately $10 l.f.) for collector streets.

[2] Maintenance costs are based upon current city costs for the a) replacement or repair of surface pavement, curbs, storm sewers and drainage swales and b) the yearly maintenance (mechanical sweeping and mowing). Replacement costs assume the following lifetimes: a) surfacing and curb and gutter = 30 years; b) resurfacing = 10 years; c) repavement = 60 years; d) swales = 10 years.

* Dimension face of curb to face of curb.

Sidewalk Standards

According to Wichita's subdivision regulations, sidewalks are required on both sides of the street. It is proposed that the standard be improved so that 1) no sidewalks are placed along collector streets, and 2) one 4' sidewalk is required along loop, cul-de-sac, eye-brow, and private drive streets and additional 4 or 6', pedestrian and bike paths through dedicated open space to provide an inter-connecting network as shown in figures R-12 and R-13.

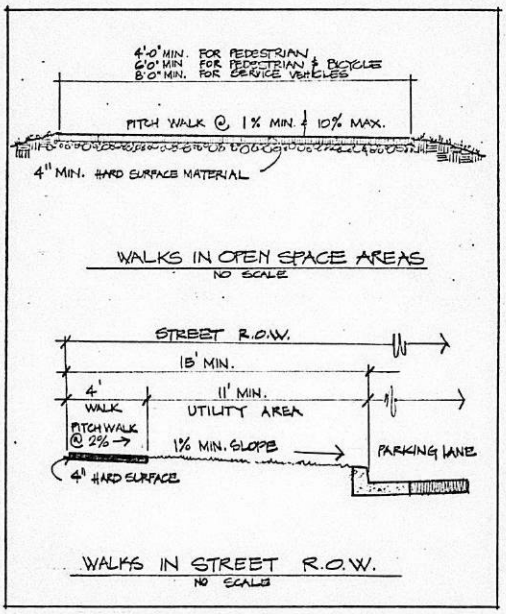
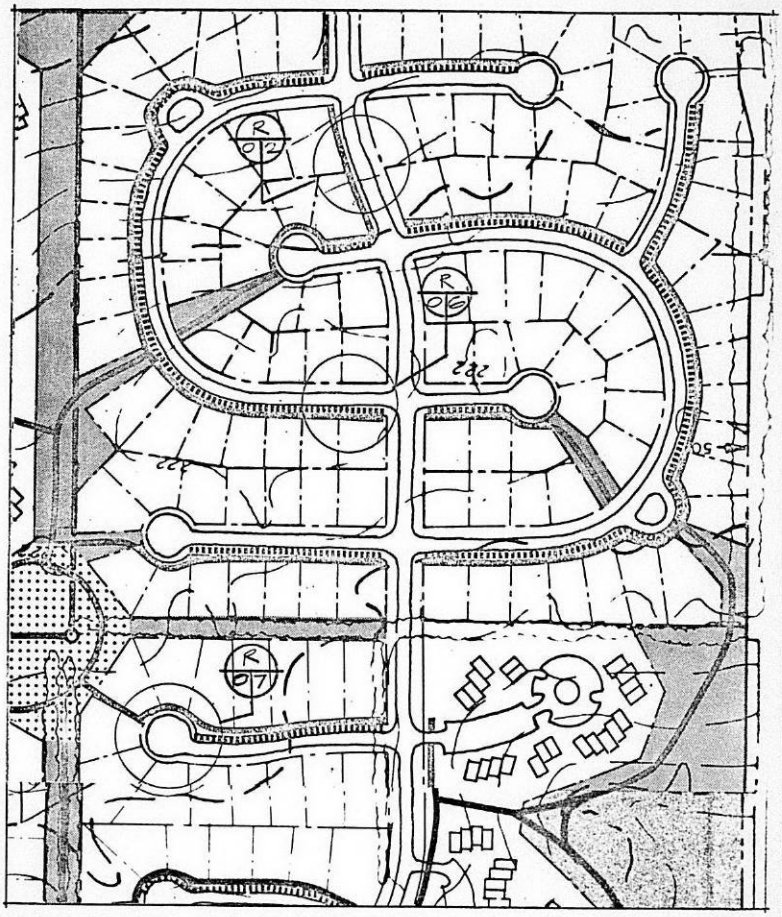


Figure R-12. Typical Sidewalk Sections



SIDEWALK
STREET PARKING
DEED-RESTRICTED OPEN SPACE
COMMON OPEN SP.

DETAIL: OPEN SPACE, PARKING & SIDEWALK LOCATION

JOB: COMOTARA

SC: 1" = 200'
DR: J.L
DA:

INDEX CODE: R / 0 / 13

Sidewalks should offer a safe, efficient means for pedestrian movement. In general, a complete separation of vehicular and pedestrian circulation system is desirable for maximum safety. Comotara features a network of open space corridors which link all major pedestrian-oriented facilities of the site and provide a logical location for pedestrian as well as bicycle paths. The separation of auto and foot traffic possesses obvious safety advantages and offers increased amenity for the pedestrian and cyclist. Sidewalks along heavily traveled and/or high speed roads are especially dangerous and therefore sidewalks have been eliminated along collector roads. Sidewalks along residential streets may be necessary and desirable, but one sidewalk along residential accessways has been shown to be sufficient if alternate open space pathways are available.

The recent study of "Residential Streets" published jointly by the Urban Land Institute, the American Society of Civil Engineers, and the National Association of Home Builders says:

> "Realistic evaluation often will reveal sidewalks on one or both sides of a minor residential street will be superfluous. When children are anticipated and paved private driveways will not be installed, sidewalks should be installed on at least one side of the street... Sidewalks within the rights-of-way of short culs-de-sac or courts may produce insufficient benefit to justify the cost. The added edge maintenance such sidewalks entail may make them a greater liability than asset."

Curb and Gutter Standards

Wichita's subdivision regulations require curb and gutter along all roads. It is proposed that curb and gutter be used for loop, cul-de-sac, and eye-brow roads (generally where there is parallel parking), but that drainage swales replace curb and gutter along collector streets, and private drives, when topographic and soil conditions permit in order to reduce runoff velocities and downstream flooding.

Generally, curb and gutter is proposed to be limited to the following:

1. Along loop streets and culs-de-sac where parking is permitted and/or topographic and/or lot size does not reasonably permit the use of drainage swales along streets.

2. Where topographic and/or soil conditions or improvements do not permit adequate overland surface flows along drainage swales.

3. Where soil and topographic conditions either restrict adequate runoff, or exceed scouring velocities as determined by the Soil Conservation Service's Engineering Field Manual or other accepted methods.

Right-of-way widths should be utilized whenever possible to recharge precipitation. By allowing storm water to drain across a road shoulder and be collected in road swales, peak storm flows can be attenuated while percolation and evaporation can occur. Similarly, storm sewers should be replaced whenever possible by drainage swales that collect and convey runoff in a natural manner. This is particularly applicable to areas where an occasional drainage easement between lots can drain water from the street to the open space area beyond. In the absence of curbs, bollards can be effectively used where vehicles are required to be confined to the pavement. In locations where topographic and/or soil conditions prevent effective use of swales, curb and gutter should be used; however, they should be integrated with drainage swales where possible to reduce design loads on the storm water system.

Supporting documentation for the use of swales in lieu of curb and gutter are provided under the Drainage and Storm Water Management System.

DRAINAGE AND STORM WATER MANAGEMENT

Collection Network - City Requirements

The collection network includes both street drainage and lot drainage. The purpose is to drain streets and lots, conveying this drainage to the flood control network.

The current storm water policy of the city is to minimize flooding problems by non-structural and structural approaches.* The purpose of the first approach is to control the extent and duration of flooding by constructing protective works and drainage improvements. The purpose of the second approach is to adjust the use of land to existing and future flood problems (i.e., floodplain regulations).

Non-Structural Measures - In an attempt to establish guidelines with which to contain development within areas which are reasonably safe from flooding, the city has established the following floodplain requirements:

> "Within any area along any natural watercourse, no structure shall hereafter be created, constructed, enlarged, moved or structurally altered with the elevation of any habitable floor, including non-flood proofed basements lower than three feet above elevation of the highest flood of record or the 100-year frequency design flood determined by the Wichita-Sedgwick County Flood Control Office or by the United States Army Corps of Engineers."

The prime standard is based on the flood of record plus three feet. This is the criterion that is in current use in establishing the boundaries of new developments. This standard has been used to locate buildable areas within Comotara.

The Subdivision Regulations are also designed to control floodplain development. Section 7-103 imposes the following restrictions:

* Drainage Problems and Protection. Wichita-Sedgwick County Metropolitan Area Planning Department (1973).

1. No land subject to periodic flooding or the 100 year flood shall be subdivided for residential use or any other use which would beincompatible with such flooding.

2. The provisions of restriction number 1 shall not bar the approval of any subdivision if improvements meeting the standards and requirements of the Flood Control Office or other available published standards and requirements are provided.

Section 8-103 of the Regulations requires tht the subdivider of a proposed subdivision shall install or provide for the installation of curbs and gutters and street drainage facilities in accordance with the standards set by the City Engineer. Kansas law provides that subdivision regulations may require the subdivider to comply with the following:

1. Specified design standards for stream channel improvements or protective works.

2. Minimum allowable ground floor elevation of structures.

3. Dedication of easements or rights-of-way for stream channels and floodplains.

4. Installation of adequate storm sewers.*

Structural Measures - The city classifies the various measures that are available to control flooding as storm drainage and flood control improvements. Because Comotara is at the headwaters we are primarily concerned with the storm drainage including small open channels, curbing, inlets and storm sewers where they are necessary.

The City has established specific guidelines to be used for open channel flow. These standards apply to the drainage swales that are proposed along collector streets and the conveyance swales that are proposed within the open space network.

1. Open channels and drainage swales must be designed to accommodate the 100 year storm. A 100 year storm of 24 hour duration is equivalent to a rainfall of 7.8 inches per hour.

* K.S.A. 12-734, 1971 Supplement.

2. A proposed open channel network must be designed to accommodate a freeboard of three feet. In order to provide for this protection within the easement a proposed swale can be expected to be 4 to 5 feet deep with maximum side slopes of 4 to 1. The City has also established that the maximum grade for open channel flow cannot exceed 0.3% unless wash checks are provided.

3. Whenever swales are proposed to replace curbs and gutters along collector streets, the City requires that the 100 year storm runoff must be contained within the proposed right-of-way. In order to provide for complete protection the following guidelines have also been established:

   a. A minimum culvert pipe size of 18 inches in diameter should be provided at intersection crossings.

   b. A minimum cover of 6 inches should be provided between the culvert and the sub-base of the street.

   c. A standard 2' x 5' inlet should be provided at the intersection of local streets.

Proposed Drainage System

The storm water management system for Comotara has been designed to accommodate city standards whenever logical. In some cases swales along streets have been used to convey runoff instead of using curbs, gutters and piping networks. The proposed swales along collector streets are part of the drainage network and, as such, their use is consistent with the current concern for storm water management.

COMOTARA STORMWATER MANAGEMENT SYSTEM
DESCRIPTION

	DESCRIPTION	DRAINAGE PURPOSE
COLLECTION NETWORK		
1. Street Drainage	1. Curb & Gutter	Drainage of residential streets and front lots
	2. Storm Sewer	Convey significant amounts of runoff to flood system.
	3. Street Swale	Drainage of collector streets and back lots; Convey significant amounts of collected runoff to flood control network.
2. Lot Drainage	1. Collection Swales	Collection of drainage from individual lots and conveyance of collected runoff to flood control network.
FLOOD CONTROL NETWORK		
1. Conveyance Swales	1. Condition A, B, C.	Convey significant amounts of collected overland flow to detention ponds.
2. Ponds		Collect and detain the increase in stormwaters generated by the development.

This kind of solution applied to individual sites or developments has the cumulative effect of attenuating peak runoff and total runoff that must be accommodated in ponds. If this process is fully applied throughout a drainage basin, it would reduce the number and size of major facilities that would be required to protect against flood hazards.* In order to ensure that these swales are properly designed to accommodate the peak flows that can be expected to occur, the following specific standards have been used.

* A Manual of Residential Storm Water Management (and Revised Edition). National Assoc. of Home Builders, (Maryland; 1973, 1975).

1. Drainage swales will be designed to accommodate the 100 year storm of a duration equivalent to the overland flow. In most cases this storm is equivalent to a rainfall of 6.5 to 7.8 inches per hour.

2. The runoff from the contributary drainage area will be accomodated within the collector street right-of-way.

3. That runoff from and along streets be carried by grass swales or standard curb and gutter and discharged into conveyance swales.

4. The street drainage not be allowed to cross local street intersections.

5. That storm sewers be used only where conditions require and be designed for a minimum number of inlets and pipes.

6. That surface runoff from rear yards of single family residences be collected by swales and discharged into a surface conveyance system.

7. That surface runoff from multi-family areas be collected in swales and/or storm sewers and discharged into conveyance swales or ponds.

8. That swales be designed to carry runoff within each drainage area according to existing topographic, soil and cover conditions and the natural character of the site.

9. Side slopes on drainage swales will not exceed 4 to 1 ratios.

10. At intersection crossings an arch or squashed culvert that is equivalent to at least an 18 inch diameter round pipe will be provided. A standard city inlet of 3.5 feet and a minimum cover over the culvert of at least 6 inches in addition to road base will be provided.

These standards have been applied to two typical drainage conditions along the collector roads. Figure D-4 indicates the typical layout and capacity for these conditions. Figure D-5 indicates a typical drainage area within which these conditions apply. The figure also indicates the calculated amounts of peak runoff that are expected to occur at representative points within the area after full development.

Two variations from standard city procedures exist for the proposed swales along the collector streets. First, in order to accommodate the use of standard City inlets that will collect water from the local residential streets a greater swale depth will be necessary. Therefore, an additional transition easement of 10 to 15 feet is necessary along each side of the right-of-way. This easement will not be used to convey storm water but may be used for the location of utilities. Second, in order to provide for proper drainage of the swale a grade of 1% to 2% has been proposed. These grades have been designed within the limits of scouring velocities for the involved soils and the characteristics of the proposed vegetation. The local Soil Conservation Service has confirmed this design standard (see Appendix).

Conveyance of runoff from collection swales and storm sewer to detention/retention ponds by overland flow can best be accomplished through the use of gently sloped grass swales. These conveyance swales are an important part of the flood control network proposed for Comotara's stormwater management system as they assist not only in directing runoff but also in controlling runoff peaks, velocities and concentrations.

The swales can be readily maintained as grass areas within easements or the open space system as summarized in the chart below and detailed in the Appendix, Figures D-6 and D-7. They will also assist in the control of erosion and sedimentation if constructed according to the design criteria established in the design standards table.

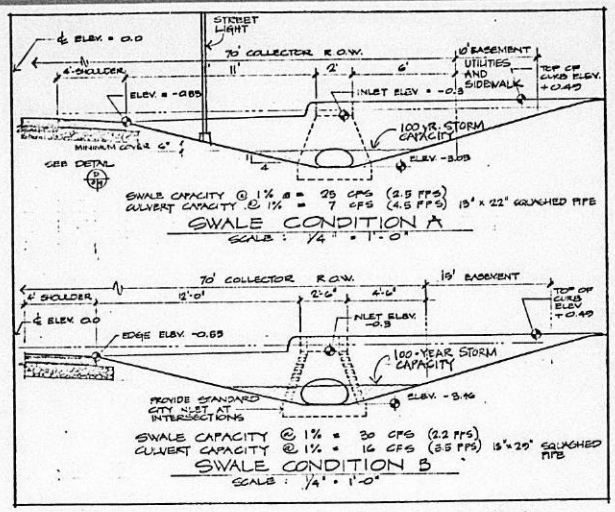


Figure D-4. Typical Collector Street Swale

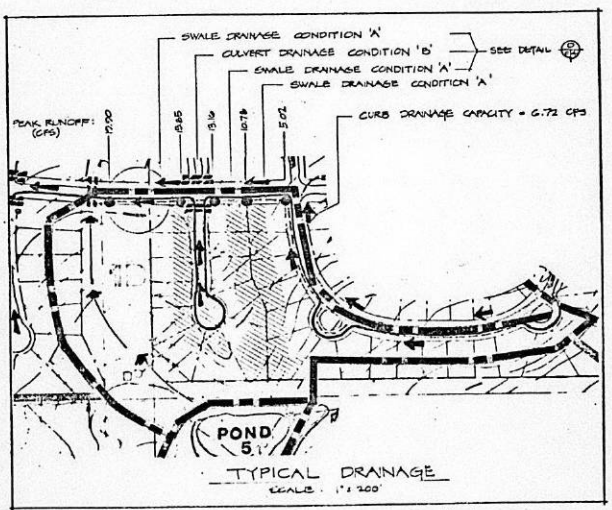


Figure D-5. Typical Drainage Conditions

COMOTARA STORMWATER MANAGEMENT DESIGN STANDARDS

	DESIGN FREQUENCY	DESIGN SECTION	DESIGN CAPACITY 1% SLOPE	2% SLOPE	R.O.W. OR EASEMENT
COLLECTION NETWORK					
1. CURB AND GUTTER	5 year		6.7 cfs (4.0 fps)	8.4 cfs (5.0 fps)	Within Street R.O.W.
2. COLLECTOR STREET SWALE A	100 year	10'	25.0 cfs (2.5 fps)	n.a.	Within Street R.O.W.
3. COLLECTOR STREET SWALE B	100 year	10'	30.0 cfs (2.2 fps)	n.a.	Within Street R.O.W.
FLOOD CONTROL NETWORK					
1. CONVEYANCE SWALE A	100 year	44'	100 cfs	n.a.	44 ft.
2. CONVEYANCE SWALE B	100 year	30'	200 cfs	n.a.	70 ft.
3. CONVEYANCE SWALE C	100 year	54'	300 cfs	n.a.	84 ft.
4. DETENTION PONDS	100 year		(*)	(*)	n.a.

(*) Ponds are designed to accomodate the temporary storage of increased peak runoff from a 100-year, 24-hour duration storm of 7.8 inches per hour. Ponds will have a minimum depth of 5 feet for permanent storage and sufficient capacity to accomodate sediment of 0.05 feet per acre.

COMOTARA RUNOFF CALCULATIONS

DRAINAGE AREA		EXISTING CONDITION RUNOFF		DEVELOPED CONDITION RUNOFF		INCREASED RUNOFF		SEDIMENT	PERMANENT POND STORAGE		TEMPORARY POND STORAGE	
NO.	SIZE (ac.)	VOL. (ac.-ft.)	PEAK (c.f.s.)	VOL. (ac.-ft.)	PEAK (c.f.s.)	VOL. (ac.-ft.)	PEAK (c.f.s.)	(ac.-ft.)	SURFACE (ac.)	ELEV.	SURFACE (ac.)	ELEV.
1A	67.1	31.0	180	33.9	210	2.9	30	3.4				
1B	50.0	23.1	149	23.3	149	.2	0	2.5				
1C	30.0	13.9	105	14.7	120	.8	17	1.5				
1D	17.1	7.9	70	8.5	85	.6	15	.9				
Total	164.2					4.5		8.3	2.0	176+	2.5	176+
2A	59.7	25.8	155	30.9	185	5.1	30	2.8				
2B	79.2	36.6	200	38.7	240	2.1	40	4.0				
2C	85.6	39.6	210	45.4	310	5.8	100	4.3				
Total	220.5					13.0		11.1	3.0	182.5+	4.0	185+
3A	24.7	12.4	88	11.4	110	1.0	22	1.2				
3B	33.0	16.4	110	15.26	110	1.2	20	1.7				
3C	4.5	2.0	28	2.4	37	.3	9	.2				
Total	62.2					2.5		3.1	1.0	208+	1.5	210+
4A	40.7	18.8	140	20.4	170	1.6	30	2.0				
4B	24.0	11.1	90	11.9	110	.8	20	1.2				
Total	64.7					2.4		3.2	1.5	207.5+	2.0	209+
5A	12.6	5.8	55	6.8	62	1.0	7	.6				
5B	34.1	15.8	115	16.8	130	.8	15	1.7				
Total	46.7					1.8		2.3	1.0	204.5+	1.5	206+

General Notes:
1. Runoff for existing and developed conditions was determined by using the Soil Conservation Society Engineering Handbook. Volume of runoff and peak runoff was calculated for a 100 year storm of 24 hour duration (approximately 7.8 inches per hour).
2. The expected sediment load was calculated according to SCS methods using a sediment factor of .05 acre-feet per acre of developed land.

The use of swales as proposed for Comotara can reduce the number and size of major facilities that would be required to protect against flood hazards.* Adequate drainage systems must be a function of storm frequency, topographical conditions, soil conditions, and size of drainage area. Consideration should also be given to the increase in runoff under developed conditions and expected sedimentation. The Drainage System Comparison's table indicates the relative values and efficiencies of the various components of the stormwater management networks that can be achieved through the implementation of the proposed design standards.

COMOTARA DRAINAGE SYSTEM COMPARISONS

TYPE	PERMEABILITY FACTOR a	RUNOFF FACTORS b		PERCOLATION POTENTIAL c	EVAPORATION POTENTIAL c	EROSION CONTROL d	SEDIMENTATION CONTROL e	COST FACTORS f	
		CONCENTRATION	VELOCITY					CONSTRUCTION	MAINTENANCE
Street Swales	80	Min.	Min.	Mod.-slight	Slight	Mod.	Mod.	Min.	Mod.-slight
Curb & Gutter	98	Increases	Increases	Min.	Min.	Max.	Min.	Mod.	Min.
Collection Swales	80	Min.	Min.	Mod.	Mod.	Mod.	Mod.	Min.	Min.
Conveyance Swales	80	Mod.	Min.	Slight	Slight	Mod.	Mod.	Min.	Mod.-slight
Storm Sewer	100	Max.	Increases	Min.	Min.	Max.	Min.	Max.	Min.
Ponds	-	Controls	Controls	Max.	Max.	Max.	Max.	Mod.	Mod.

a Cover number denoting imperviousness of cover i.e. the greater the number the less permeable or more impervious the surface.
b Runoff concentrations and velocities are increased as imperviousness increases.
c Percolation and evaporation potential decreases as imperviousness increases.
d Erosion potential is minimized if velocities of 3-4 fps are not exceeded, however, erosion potential is increased at outfall points of curb and gutter and storm sewers.
e Natural drainage systems increase sedimentation control if erosion potential is minimized.
f Natural drainage systems reduce costs over "hardware" systems as noted in Street Comparisons table.

* A Manual of Residential Storm Water Management, National Assoc. of Home Builders, Md. (1975).

Flood Control Network

In addition to a collection network, a peak runoff and flood control network is necessary to accommodate major storms. The current storm water policy is to provide for major storm flows by floodplain zoning. In this case the floodway is defined as the flood of record plus three feet. It is proposed that improvements be made to exceed the city's design standards to permit:

1. That detention ponds be designed to detain and control increased storm water runoff based on a 100 year storm frequency of 24 hour duration and an intensity of 7.8 inches per hour.

2. That retention ponds be designed and constructed to provide for sediment storage and a minimum average permanent pool water depth of 5 feet, and/or adequate flood storage capacity as determined by the Soil Conservation Service's Engineering Field Manual or other accepted methods. Figure D-8 is typical of the standards proposed for this type of solution.

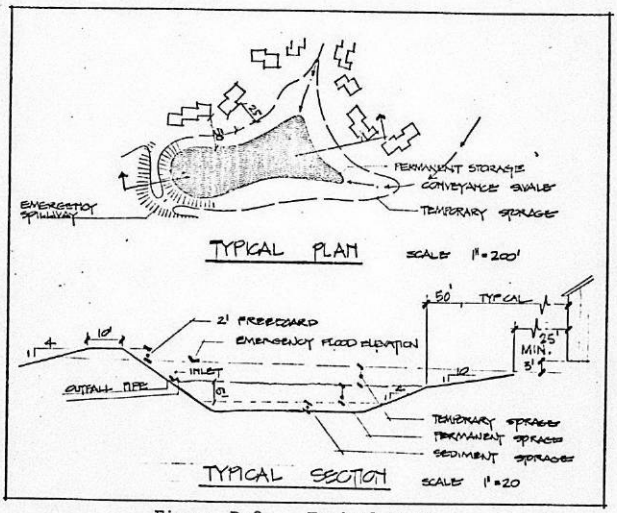


Figure D-8. Typical Pond

A flood control network should, of course, protect area residents from the hazards of flooding as does the Comotara design. But whenever possible it should also contribute to ecological balance by promoting local recharging of the underground water table, maximize municipal cost efficiencies, and augment local visual amenities. The proposed approach for Comotara provides, where conditions permit, for the detention and/or retention of collected storm water on the site, thereby preventing appreciable increases in the peak discharge of surface runoff from the site. Detention ponds, as shown in the typical detail above, serve to reduce the velocity of peak runoff while retention ponds provide for flood and peak storm runoff storage. Detailed runoff calculations and calculations for permanent and temporary pond storage have been made for Comotara as detailed for Sections B and C in the preceding Runoff Calculations chart.

The use of a detention/retention pond system is supported by the recommendations found in Urban Storm Drainage Criteria Manual, Volumes I and II, by Wright-McLaughlin Engineers for the Denver Regional Council of Governments, 1969; Water Pollution Control Federation Manual of Practice No. 9, Design and Construction of Sanitary and Storm Sewers, 1970; Research Report on Municipal Services for Residential Subdivisions, Ontario Canada Housing Advisory Committee, 1972; and A Manual of Residential Storm Water Management Development Standards, National Association of Home Builders, 1973. The above studies also strongly support the concept of two storm water management systems, a convenience system for minor storms and a flood system for major storms, as proposed for Comotara.

APPENDIX

Acknowledgements

Various officials and representatives of the City of Wichita, Sedgwick County, State of Kansas, and various consulting engineers have been contracted and have contributed information used in this Report and/or found in the supportive documents. We wish to acknowledge their kind assistance.

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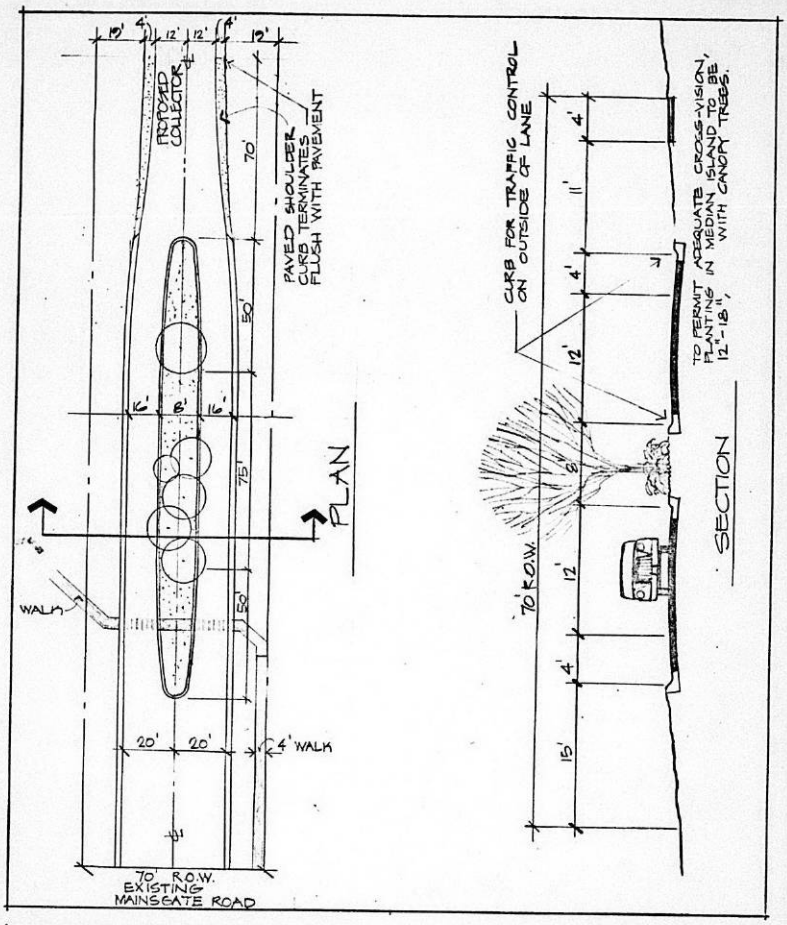
APPENDIX

Supportive Documents



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STETSON HOUSE
1717 SPRING GARDEN ST PHILADELPHIA PA 19130 215 LOB 2545
166 E ST ANDREWS DR MOORESTOWN NJ 08057 609 WO4 3323

DETAIL: TRANSITION CONDITION BETWEEN EXISTING MAINSGATE ROAD AND PROPOSED COLLECTOR

JOB: COMOTARA

SC:
DA:
DR: JL.

INDEX CODE: R 03

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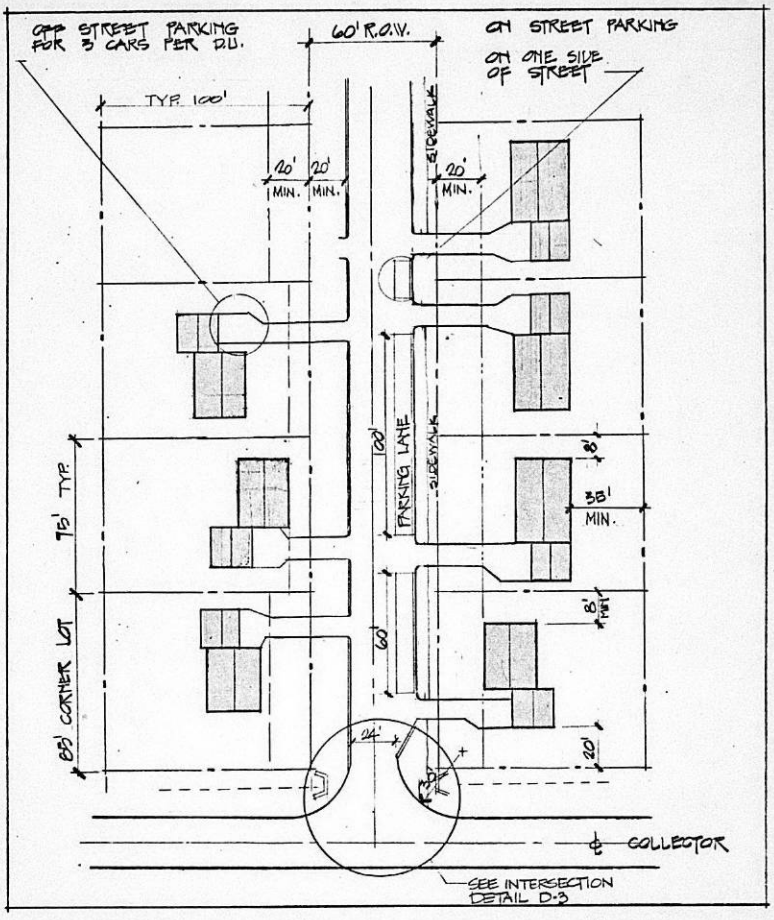
STETSON HOUSE
1717 SPRING GARDEN ST PHILADELPHIA PA 19130 215 LOB 7545
166 E ST ANDREWS DR MOORESTOWN NJ 08057 609 W04 3323

DETAIL: COLLECTOR DIVIDED ENTRANCE

JOB: COMOTARA

INDEX CODE: SC: AS SHOWN
BA: J.L./DS
R
0 | 4



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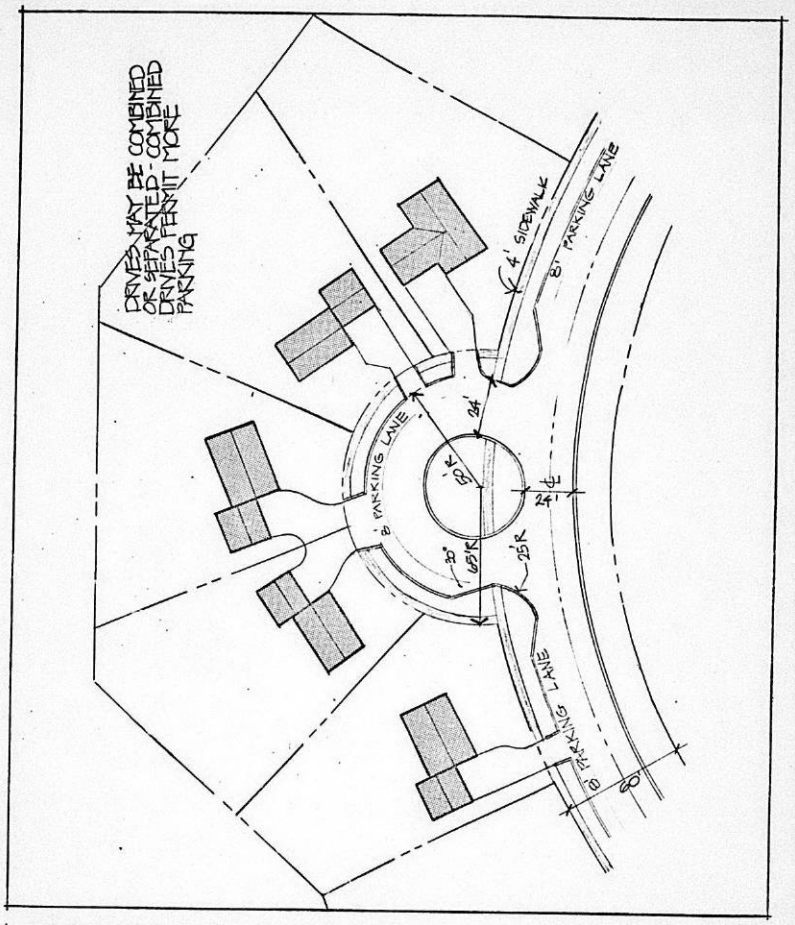
STETSON HOUSE
1717 SPRING GARDEN ST. PHILADELPHIA PA 19130 215 LOB 7545
166 E ST ANDREWS DR MOORESTOWN NJ 08057 609 WOR 3323

DETAIL: TYPICAL LAYOUT - LOOP STREET

JOB: COMOTARA

SC: 1" = 50'
DR: M.S./DS.

INDEX CODE: D 5



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ATKESON HOUSE
1717 SPRING GARDEN ST PHILADELPHIA PA 19130 215 LOB 2545
166 E ST ANDREWS DR MOORESTOWN NJ 08057 609 WOR 3323

DETAIL: TYPICAL LAYOUT EYEBROW

JOB: COMOTARA

SC: 1" = 50'
DA:
DR: M.S/D.S.

INDEX CODE: R 09

FIRE FIGHTING ACCESSIBILITY

The city provides for the access of fire fighting vehicles into residential areas by requiring that the following clearance width standards be followed:

a. Normal residential streets

Total roadway (with parking and curbs)	34 feet
Parking area (both sides)	-16 feet
Available fire easement clearance	18-22 feet

b. Private drives and streets

2-100 foot pieces of aerial equipment	14 feet
Passing and clearance area	10 feet
Required fire easement clearance	24 feet

R.O.W. radius for culs-de-sac 50 feet

Outside pavement diameter for culs-de-sac 70 feet

The city does not encourage the design of center islands because of maintenance problems.

Although a wider clearance width is required for private drives and streets, the city has explained that the parking areas of normal residential streets could be used for fire access during emergency situations. These standards are not based on specific design or vehicle requirements.

State Highway Commission of Kansas

ROBERT B. DOCKING, Governor

STATE OFFICE BUILDING
TOPEKA, KANSAS 66612

June 7, 1974

Section 8-B
Wichita ATS

Mr. Dan Estraub
Rahenkamp, Sachs, Wells & Assoc.
1717 Spring Garden
Philadelphia, Pennsylvania 19130

Dear Mr. Estraub:

This is to confirm our telephone conversation on June 6, 1974 concerning the factors we used for the Wichita Urban Area in the Multiple Regression Analysis to determine trip generation equations.

The equations are:

A. HBW - P: $y = 13.3 + 1.44$ DU
B. HBW - A: $y = 2.1$ Comm $+ 0.4$ MAN $+ 0.1$ PQP (Zone 1-70)
$y = 1.1$ Comm $+ 0.4$ MAN $+ 0.1$ PQP (Zone 71-►)
C. HBO - P: $y = 2.8$ DU
D. HBO - A: $y = 25.0 + 3.5$ Comm $+ 0.7$ DU $+ 0.3$ PQP (Zone 1-70)
$y = 25.0 + 2.5$ Comm $+ 0.7$ DU $+ 0.3$ PQP (Zone 71-►)
E. NHB - TE: $y = -72.9 + 2.56$ DU
F. TRK - TE: $y = -30.0 + 3.1$ Comm (Zone 1-70)
$y = 25.0 + 1.01$ DU $+ 0.11$ Comm $+ 0.05$ MAN (Zone 71-►)
G. EXT - A: $y = 0.11$ Comm $+ 0.04$ MAN $+ 0.20$ DU

DU = Dwelling Units
Comm = Commercial (Thousands of Square Feet)
MAN = Manufacturing (Thousands of Square Feet)
PQP = Public-Quasi-Public (Thousands of Square Feet)
HBW = Home Based Work - (P = Productions, A = Attractions)
HBO = Home Based Other - (Productions and Attractions)
NHB = Non Home Based - Trip Ends
TRK = Truck - Trip Ends
EXT = External - Attractions

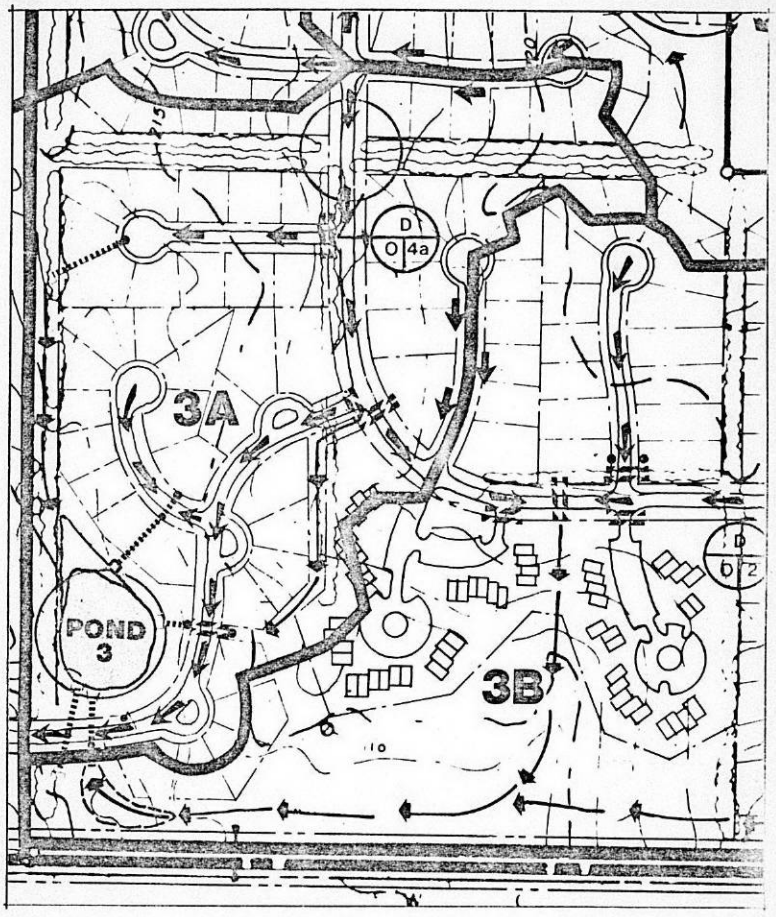
If you need anymore information, please do not hesitate to contact us.

Very truly yours,

VERNE L. CRAIG, P.E.
ENGINEER OF PLANNING AND DEVELOPMENT

E. D. LANDMAN, P.E.
Assistant Engineer of Planning and Development - Systems Planning

EDL/VC:dh



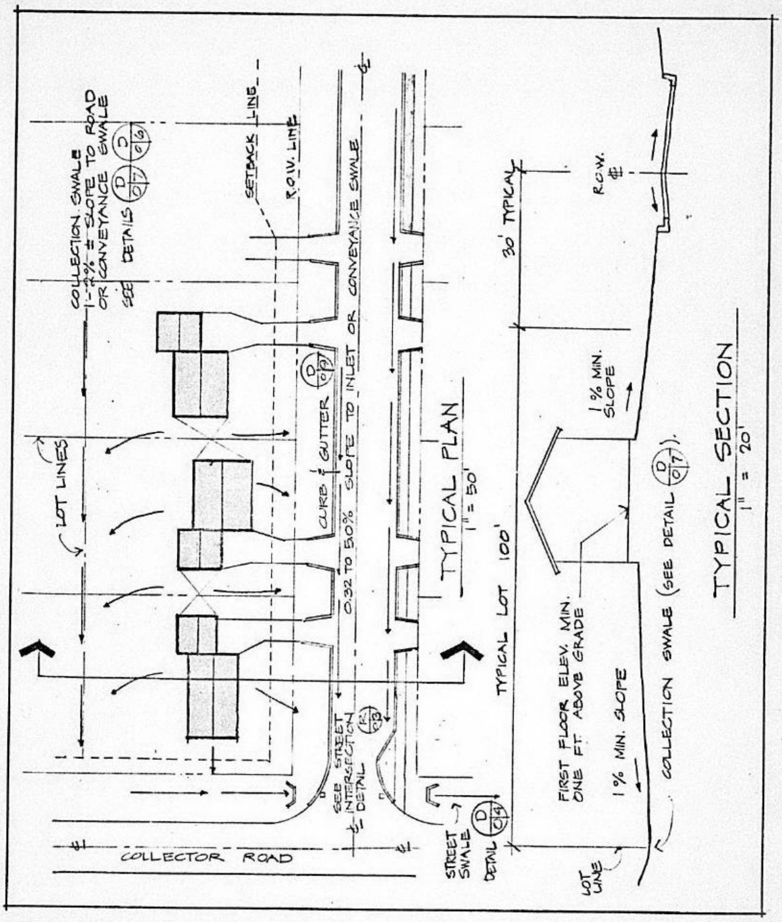
3A DRAINAGE AREA DESIGNATION
DRAINAGE FLOW
6 STANDARD DETAIL KEY
STORM SEWER
CONVEYANCE SWALE
CULVERT AND INLET

DETAIL: DRAINAGE SYSTEMS

JOB: COMOTARA

SC: 1" = 200'
DA: 1/31/75
DR: J.L.

INDEX CODE: D 0 1



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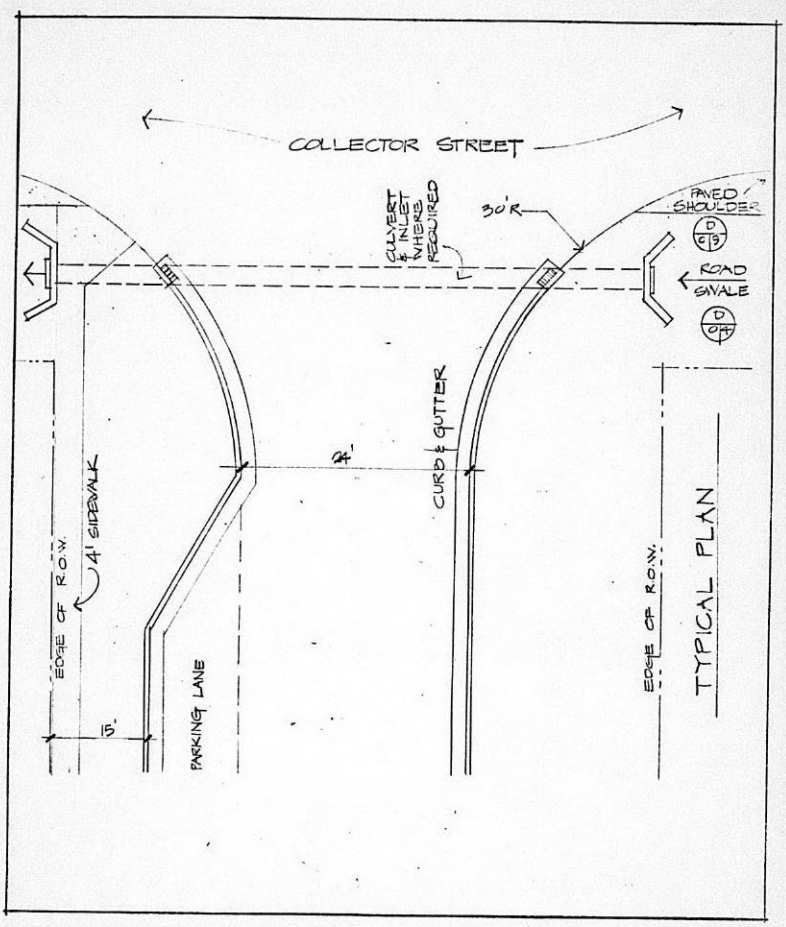
STETSON HOUSE
1717 SPRING GARDEN ST PHILADELPHIA PA 19130 215 LO8 2545
166 E ST ANDREWS DR MOORESTOWN NJ 08057 609 WO4 3323

DETAIL: TYPICAL STREET DRAINAGE

JOB: COMOTARA

SC: AS SHOWN
DA:
DR: M.S.

INDEX CODE: D 0 2



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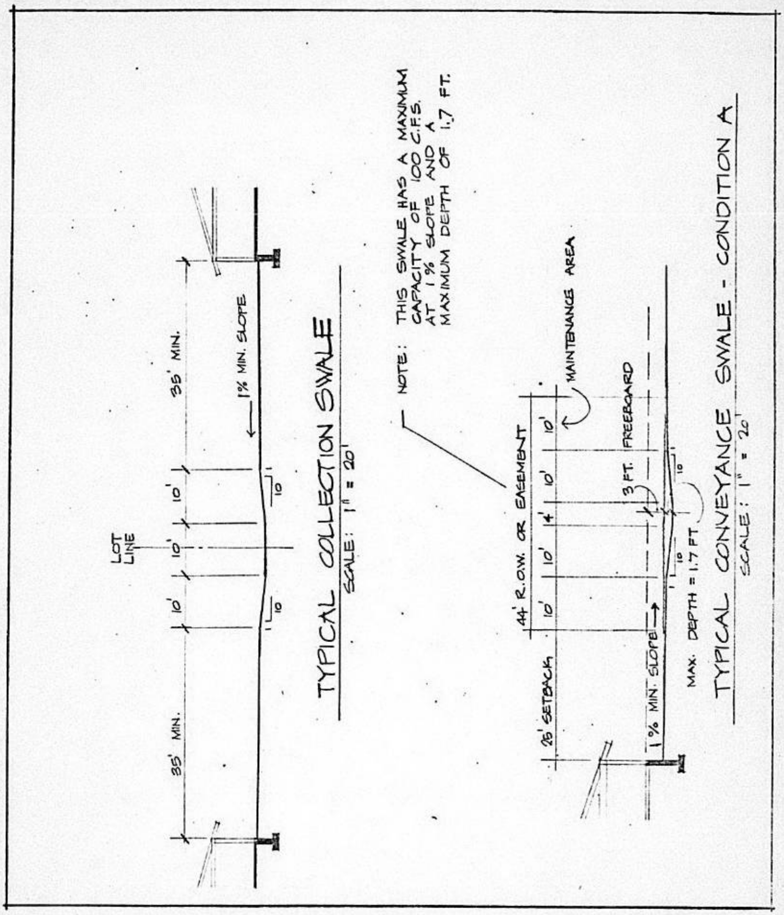
STETSON HOUSE
1717 SPRING GARDEN ST PHILADELPHIA PA 19130 215 LOB 7545
166 E ST ANDREWS DR MOORESTOWN NJ 08057 609 WO4 3323

DETAIL: TYPICAL COLLECTOR INTERSECTION

JOB: COMOTARA

SC:
DA:
DR: M.S./DS

INDEX CODE: D 0/3



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1717 SPRING GARDEN ST PHILADELPHIA PA 19130 215 LO8 7545
166 E ST ANDREWS DR MOORESTOWN NJ 08057 609 WO4 3323

DETAIL: TYPICAL COLLECTION AND CONVEYANCE SWALE

JOB: COMOTARA

SC: 1" = 20'
DA:
DR: M.S./DS

INDEX CODE: D 0 6

NOTE: THIS SWALE HAS A MAXIMUM CAPACITY OF 200 C.F.S. @ 1% SLOPE; MAX. DEPTH 1.9 FT.

TYPICAL CONVEYANCE SWALE - CONDITION B

SCALE: 1" = 20'

NOTE: THIS SWALE HAS A MAXIMUM CAPACITY OF 300 C.F.S. @ 1% SLOPE AND MAXIMUM DEPTH OF 2.1 FT.

TYPICAL CONVEYANCE SWALE - CONDITION C

SCALE: 1" = 20'

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STETSON HOUSE
1217 SPRING GARDEN ST PHILADELPHIA PA 19130 215 LOB 7545
166 E ST ANDREWS DR MOORESTOWN NJ 08057 609 WO4 3323

DETAIL: TYPICAL CONVEYANCE SWALE

JOB: COMOTARA

INDEX CODE: SC: 1" = 20'
SA: M.S./DS

D
07

RAHENKAMP SACHS WELLS AND ASSOCIATES INC
PLANNERS • LAND PLANNERS • LANDSCAPE ARCHITECTS

STETSON HOUSE
1717 SPRING GARDEN ST PHILADELPHIA PA 19130 215 LOB 7545
166 E ST ANDREWS DR MOORESTOWN NJ 08057 609 WOR 3323

DETAIL: CURB AND SHOULDER SECTIONS

JOB: COMOTARA

SC: AS SHOWN
DA:
DR: MS

INDEX CODE: D 09

FLOOD CONTROL IN WICHITA

1. The delination of the area of record flood plus 3' is not an ordinance on state statutes, but rather a guide that can be adjusted as long as two demands are observed:

   a. That development and fill is restricted from the floodway (area of record flood established by the flood of 1960).

   b. That development in the area adjacent to the floodway and within a 3' elevation may occur only if the lowest floor elevation is to or above the level of the 100-year frequency flood, and together with attendant utility and sanitary facilities, to be floodproofed up to the level of the 100-year flood.

2. Allowable methods of permitting develoment in the freeboard (the area adjacent to the floodway and within a 3' elevation) include:

   a. Improving the drainage channel.

   b. Using fill to raise the floor elevation provided that the operation is outside the level of the 100-year flood.

3. The flood control office prefers that the drainage corridor be left in a natural state rather than channelized, and building development take place outside the floodway plus freeboard.

4. The area designated as the flood of record was established by flood marks left by the floods of July and August of 1960, at that date. The actual storm frequency was never established, nor can a 100-year frequency storm be established because there are no rainfall recording stations and no records by which to make comparisons.

5. The floodway and freeboard in the drainage basin occupied by Midwest Piper has not been established, but development, there too, would have to respect a 100-year frequency storm (plus some freeboard - not established as yet).

Conditions which effect the extent of freeboard include:

a. Size of channel

b. Condition of water escaping the channel, surmounting levees, etc.

c. Side drainage slopes.

d. Size of drainage basin.

6. Land management and use requirements as set down by the national flood insurance program are not clear at this time. Present conditions are solely applied on 100-year frequency storms on major streams. It is not known whether this applies to all feeder streams and the street drainage system. Mr. Mitchell feels that within 10 years time the latter two drainage areas would be included under the conditions set down by the flood insurance program.

7. No specific program exists for sediment and erosion control. The Department of Flood Control Maintenance recommends a 50-year design period for open channels plus 3 feet of freeboard. In addition, they require 15 feet of maintenance easement on each side of the channel and 4:1 side slopes. Therefore, a channel cross-section requires 30 feet easement plus 8 feet width for every foot of depth plus the channel bottom width. Any such channel improvements must be completed by the developer at his expense.

8. Retention ponds have not been widely used in Wichita because of the lack of retention capacity of most of the soils in the area. In addition, a dam permit from the State Department of Water Resources must be obtained before city approval can be obtained. The department of Flood Control Maintenance would accept SCS procedures to determine runoff for ponds but encourages the use of the Rational formula.

9. The high rainfall periods are in March, April, November and December, and the normal open channel conveyance swales can be designed for a 50-year design period with an additional freeboard of 3 feet. The city will require 4:1 side slopes on drainage channels or swales and at least 15 feet of access width for maintenance on both sides of the channel. This usually requires a right-of-way of 60 feet. All improvements on open channels are to be completed by the developer and may not be permitted by the city until the improvements necessary to accommodate the increased flows are completed downstream.

10. The city design standard is a storm frequency of 5 years for piping systems and a frequency of 100 years for overland flow. The actual duration is based on the time of concentration. In those areas where runoff is to be piped, the flood overflow can be accommodated within the street section but cannot be allowed to inundate any buildings.

RETENTION AND DETENTION PONDS

1. The surface soils in the Wichita area are clayey and loamy exhibiting an impervious character. Therefore, the runoff is moderate to rapid; and water and wind erosion is severe especially adjacent to drainageways and steeper slopes. The actual percolation rates vary from .03 to .06 inches per hour.

2. The existing ponds on the site were designed by SCS, built by landowner farmers and inspected by SCS. The main purpose of the ponds is to stop or detain storm waters. Typical design techniques were used and the ponds currently receive little maintenance except for the grass spillways.

3. In order to function as storm water control devices in an open space system, any ponds would be required to be designed as detention dams. As such they would reduce downstream flooding. The constraints on the Comotara site that must be recognized in designing ponds are the existence of Wellington shale approximately 2 to 6 below surface, and the existence of only 2 to 3 feet of this shale within the rippable category.

4. According to state law any ponds or dams built in areas of high risk must be designed according to more stringent specifications. High risk areas are defined as adjacent to major roads or adjacent to residential development.

SWALE DESIGN

Problem Statement

1. What is the capacity of a trapezoidal swale with a bottom dimension (b) of 2', side slopes (z) equal to 4:1, and depth (d) of 1'?

2. Design two trapezoidal swales to carry 100 and 300 cfs at a slope of 1%.

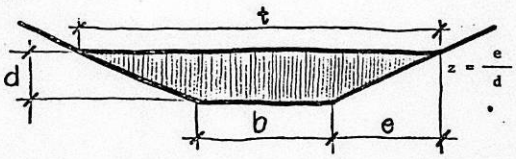
Results

1. The capacity of a swale with the above dimensions is 20.9 cfs. However, within a 15' R.O.W. this allows 2.5 feet on either side of the swale. Therefore, in order to use the same side slope (or at least not greater) the difference in elevation between the bottom of swale and the edge of the road can only be 1.625' (1' depth in the swale + .625' freeboard).

2. The following table lists the flows and design parameters of the swales to provide the given capacities:

Flows(cfs)	Depth(d)	Side Slopes(z)	Bottom Dimension(b)	Top Dimension(t)
300	2.1'	15:1	4'	67'
100	1.7'	6:1	4'	24.4'

where



Note: These dimensions do not include the maintenance area required by the city.

SWALE VEGETATION

Vegetation for use in swale system, sediment storage, and slopes for swale sidewalls.

1. Two grasses are considered desirable for use in the swale system for Comotara. They are Bermudagrass and a Fescue known as Kentucky 31.

   a. Bermudagrass is the more erosion resistant cover. It is a warm season grass which in the Wichita area will require some maintenance. It may appear brown during winter months.

   b. Kentucky 31 is less erosion resistant. It is a cool season grass which should only experience browning during extreme drought periods. 31 tends to grow in clumps; however, this can be overcome by approximately doubling the seed application rate. It is also true that the thicker it is planted, the shorter it grows. It will also result in a cost saving (as compared with Bermudagrass) of about $15 per acre. However, this is probably negligible.

   c. Both grasses require nitrogen fertilization once a year. Both should be kept mowed at about 3 to 3½ inches.

   d. The best time for planting is after the first good rain in late August: August 15 to September 15. Kentucky 31 should be established before the first frost, whereas Bermudagrass will be completely established by the following year.

   e. It appears that both grasses should be considered at this point although Bermudagrass, due to its increased erosion resistance, is most likely.

2. No sediment storage is required in the ponds because no significant sediment production is anticipated.

3. Both vegetation types are suitable for use on 6:1 side slopes in the swales. The maximum slope they can be used on is 3:1. A better grass for the 3:1 condition, in terms of erosion resistance, is Bromegrass. However, it is not as erosion resistant as Bermudagrass as it scours more readily, is a coarse grass which is best maintained at 6" (it can be cut to 3" provided it is allowed to grow back to 6"), giving it a good "long-view" appearance. Nonetheless it is used extensively in waterways in Kansas.

In summary, Bermudagrass is the best grass in terms of maximum flow conditions. However, it is slightly more expensive in planting and maintenance. Where side slopes of 3:1 are necessary, Bromegrass is more desirable although less appealing and will reduce the flow capacity in the swale relative to Bermudagrass. Thus, the order of grasses to be used where they are feasible should be 1) Kentucky 31, 2) Bermudagrass, and 3) Bromegrass.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

4100 Maple
Wichita, Kansas 67209
316 943 9471

March 15, 1975

Mr. Iain Robertson
1717 Spring Garden Street
Philadelphia, PA 19130

Dear Mr. Robertson:

Enclosed is a copy of the information that you requested from our handbooks on velocities. Our soils in the Wichita area definitely fall under the easily eroded category on the table and I feel that this table is fairly lenient in the minimum velocity it lists for various grasses. I feel that 3 feet per second on all grasses except Bermudagrass, and not over 4 feet per second on Bermudagrass, is a good rule to follow.

If I can be of further help to you, feel free to contact me.

Sincerely,

Larry L. Henry
District Conservationist

Cover	Slope range 2/ (percent)	Permissible velocity 1/	
		Erosion resistant soils (ft.per sec.)	Easily eroded soils (ft.per sec.)
Bermudagrass	0-5 5-10 over 10	8 7 6	6 5 4
Bahia Buffalograss Kentucky bluegrass Smooth brome Blue grama Tall fescue	0-5 5-10 over 10	7 6 5	5 4 3
Grass mixtures Reed canarygrass	2/ 0-5 5-10	5 4	4 3
Lespedeza sericea Weeping lovegrass Yellow bluestem Redtop Alfalfa Red fescue	3/ 0-5	3.5	2.5
Common lespedeza 4/ Sudangrass 4/	5/ 0-5	3.5	2.5

1/ Use velocities exceeding 5 feet per second only where good covers and proper maintenance can be obtained.

2/ Do not use on slopes steeper than 10 percent except for vegetated side slopes in combination with a stone, concrete, or highly resistant vegetative center section.

3/ Do not use on slopes steeper than 5 percent except for vegetated side slopes in combination with a stone, concrete, or highly resistant vegetative center section.

4/ Annuals--use on mild slopes or as temporary protection until permanent covers are established.

5/ Use on slopes steeper than 5 percent is not recommended.

Exhibit 7-3. Permissible velocities for channels lined with vegetation

Retardance	Cover	Condition
A	Reed canarygrass	Excellent stand, tall (average 36 inches)
	Yellow bluestem Ischaemum	Excellent stand, tall (average 36 inches)
B	Smooth bromegrass	Good stand, mowed (average 12 to 15 inches)
	Bermudagrass	Good stand, tall (average 12 inches)
	Native grass mixture (little bluestem, blue grama, and other long and short midwest grasses)	Good stand, unmowed
	Tall fescue	Good stand, unmowed (average 18 inches)
	Lespedeza sericea	Good stand, not woody, tall (average 19 inches)
	Grass-legume mixture--Timothy, smooth bromegrass, or orchard grass	Good stand, uncut (average 20 inches)
	Reed canarygrass	Good stand, mowed (average 12 to 15 inches)
	Tall fescue, with bird's foot trefoil or lodino	Good stand, uncut (average 18 inches)
	Blue grama	Good stand, uncut (average 13 inches)
C	Bahia	Good stand, uncut (6 to 8 inches)
	Bermudagrass	Good stand, mowed (average 6 inches)
	Redtop	Good stand, headed (15 to 20 inches)
	Grass-legume mixture--summer (Orchard grass, redtop, Italian ryegrass, and common lespedeza)	Good stand, uncut (6 to 8 inches)
	Centipedegrass	Very dense cover (average 6 inches)
	Kentucky bluegrass	Good stand, headed (6 to 12 inches)
D	Bermudagrass	Good stand, cut to 2.5-inch height
	Red fescue	Good stand, headed (12 to 18 inches)
	Buffalograss	Good stand, uncut (3 to 6 inches)
	Grass-legume mixture--fall, spring (Orchard grass, redtop, Italian ryegrass, and common lespedeza).	Good stand, uncut (4 to 5 inches)
	Lespedeza sericea	After cutting to 2-inch height. Very good stand before cutting
E	Bermudagrass	Good stand, cut to 1.5-inch height.
	Bermudagrass	Burned stubble.

Exhibit 7-2. Classification of vegetation cover as to degree of retardance.