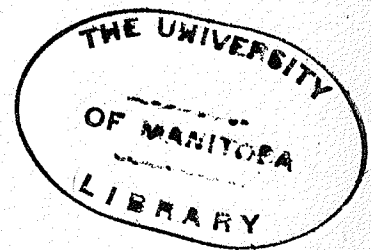


A RESIDENTIAL SUBDIVISION
FOR CALGARY, ALBERTA

BY

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CHAPTER ONE

INTRODUCTION

The subject of this thesis is the development of a parcel of land of approximately 510 acres located in Calgary, Alberta. The development of this land as a mere residential acreage to add to the "suburbia" of the city, without the provision of certain necessary community facilities, would hardly make suitable subject matter. Fortunately, the owner, a large development company, has realized the need for the development of his land as a residential community. Commendable as this is with respect to planning principles, the owner has no doubt been influenced by the greater financial return and the increased sales turnover that are likely to result, if the land were designed and developed as a complete neighbourhood.

Neighbourhood design involves many responsibilities on the part of the designer. He must integrate the neighbourhood with the surrounding area, and respect the subdivision regulations and highway proposals set forth by the Planning Commission. Lastly, he must satisfy the developer with respect to a reasonable financial return on his investment. After all, land is developed for the purpose of acquiring capital gain as a compensation for the risks involved in the undertaking.

The above responsibilities will be dealt with in

this thesis. Its contribution to the field of planning is believed to be the fact that the various design phases, as well as the difficulties encountered, will be presented in the same manner as they actually occurred.

The information needed for this approach and treatment of the problem was supplied by the developer to Professor V. J. Kostka. The writer appreciates the opportunity to acquire experience in large-scale design, in which the knowledge of planning principles must be combined with the modifying factors of practice.

CHAPTER TWO

THE SITE

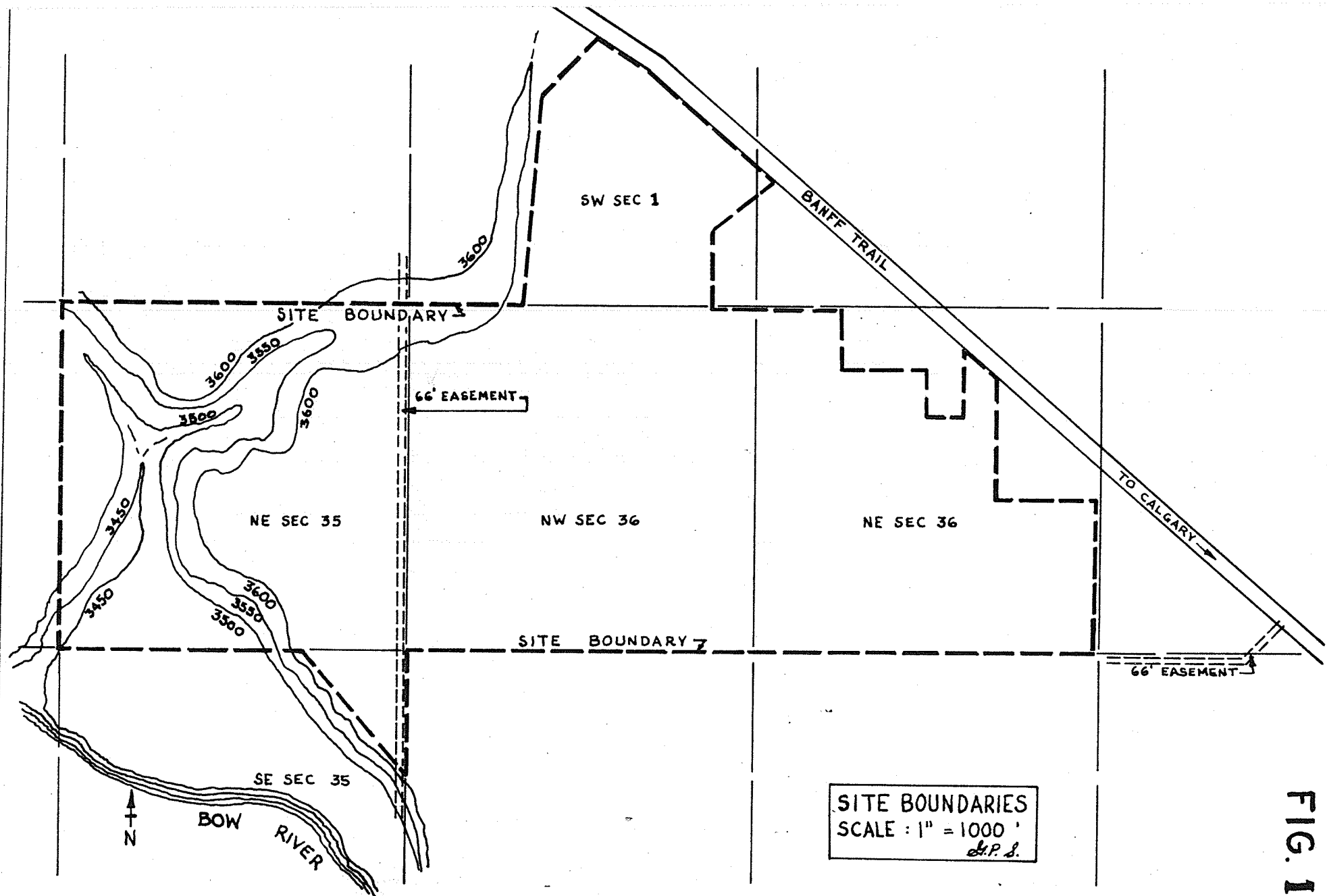


FIG. 1

The site, shown in Fig. 1, and in the large topographical map enclosed with the plans, is located in Township 24, Range 2 West of the 5th Meridian. Its present land use is agricultural with a change to residential use permissible after the approval of the design has been given by the Technical Planning Board of the City of Calgary.

The boundaries of the site deserve careful consideration because of their irregularity and the resultant modifying influences on the design.

Along the north-eastern boundary of the site lies the Banff Trail, (Highway No. 1A), which leads directly to the city centre in the south-east. Although the existing pavement is only 22 feet wide, the future right-of-way will be 132 feet wide and the pavement width 56 feet. Easement restrictions, varying from 50 to 66 feet, for future service roads along the abutting land, must be considered. The value of some of the property fronting on the highway has increased to the extent that the developer thought it inadvisable to acquire them. This explains the meandering nature of the site boundary to the north-east.

The southern boundary encloses a large triangular parcel of land overlooking the Bow River to the south-west. This parcel is bordered by a high-power electric transmission line operated by the City of Calgary Power

and Light Company. The power line, and a 66 foot easement to provide access to the towers and wires, runs due north across the site, and will no doubt exercise a definite influence on the design in this area.

Across the most westerly quarter section of the site lies a wide and deep ravine, with slopes of 25 per cent or more. This ravine cuts off a buildable parcel of land of 40 acres in the north-west, thus isolating its development. The eastern edge of the ravine will provide an excellent setting for a number of lots, and the future demand for these may indicate that an access road or even a bridge to the other side of the ravine might be economically feasible. However, at this time it appears that the development of the isolated area should not be contemplated as a part of the proposed subdivision.

Excluding the ravine area, the site is generally flat, with an average contour elevation of about 3600 feet. There are a few plateaus and depressions with a variation in elevation of 20 to 30 feet, and a centrally located ridge-line with an elevation of 3612 to 3624 feet. Since active farming and grazing have removed all of the trees and most of the shrubs, there is nothing to prevent the utilization of the plateaus and the ridge in the design, thus taking advantage of the best land of the rolling terrain of the site.

The nearest water main and ~~sewerage~~ trunk connections are located at the intersection of the Banff Trail and an extension of the southern boundary of the site, approximately 1100 feet east of the developer's land. The Planning Board has granted a 66 foot easement for the extension of these services to the site, but since the sanitary sewage wastes of the entire development must be carried to this point, the excavations for the sewerage system will be deep and expensive in the eastern half of the site. The developer purchased two additional parcels of land to the south-east to control the development of the land located along the proposed main trunk sewer. No difficulty is foreseen in the design and construction of the storm water drainage system. The storm flow east of the ridge will be drained to the existing storm sewers located along the Banff Trail, and the storm flow west of the ridge will be drained to the ravine and thence to the Bow River.

The necessary tests for the purpose of excavations for foundations on the site have been carried out by the consulting firm of Strong, Lamb, and Nelson of Calgary, who have reported that suitable conditions exist.

The site is ideally located with respect to the land uses of the nearby areas, and the city centre. To the north-east, a recently approved residential subdivision will be developed, and the shopping and educational

facilities erected therein and along the highway will assist in the promotion and development of both sites. The Calgary Municipal Airport is located about five miles further north-east, beyond a range of hills. The aircraft approach lanes, oriented east-west and north-south, should cause little or no noise problems and hazard dangers to the future residents. Immediately adjacent to the south-east, the land is owned by the Department of Veteran Affairs and an industrial research laboratory. On these lands there are suitably designed and landscaped buildings. The new campus of the Calgary University of Alberta is conveniently located south-east. The land immediately south of the site is owned by another development company. To the south-west the Bow River provides a scenic transition to the industrial area and the Trans-Canada Highway. To the west, the Foothills and Rocky Mountains may be seen in the distance.

The only existing gateway to the site is the Banff Trail, which will become inadequate for the traffic to be generated by the future expansion of this and the surrounding areas. The Technical Planning Board has been engaged in a study for the location of a system of perimeter or by-pass routes for the city, and its specific proposal for the West By-pass Route will be dealt with in considerable detail in the following chapters.

The final design must consider all of these features: the irregular boundaries, the surrounding present and future land uses, the present and future connecting highways, the topographical features, the land easements and restrictions, and the location of the utilities and services. With these general considerations in mind, the planner must now consider the requirements of the developer and the community, and co-ordinate all of these considerations into his proposal.

CHAPTER THREE

DESIGN REQUIREMENTS

As has been stated, the developer provided the necessary information for the design of this subdivision which enabled the author to achieve a certain project realism. This information will now be presented and it will be respected as much as possible by the writer in the plan. Nevertheless, the author will not regard the developer's commercial interests as the only objective.

The developer wishes to build a subdivision for medium income or "middle class" families, consisting of homes with values of \$15000 to \$18000, including land and improvement costs. In the western portion of the site, particularly along the edge of the ravine, the development of a "higher class" portion is contemplated, with values of \$18000 to \$35000.

The developer would prefer a subdivision without back lanes, but he is only too familiar with the present Calgary requirement that lanes must be provided in medium class subdivisions. His preference for lot sizes is a minimum of 51 by 110 feet if lanes are employed, and 55 by 100 feet if no lanes are employed.

Since row housing is not yet in any great demand in the city, their inclusion in the design will not be considered. However, a limited number of small apartments, 56 by 120 feet, will be incorporated.

The developer is convinced of the desirability of providing the following community facilities, apart

from those required by law: a community hall approximately 300 by 400 feet; a club house 50 by 60 feet; a basketball court; a skating rink and a swimming pool. Three church sites of about an acre each are also intended. The developer feels that a shopping centre large enough to satisfy at least the needs of the families within the subdivision should be located on his land.

The inclusion of such community facilities in the subdivision is likely to improve the quality of the residential environment to the extent that the development might take the form of, and function as, a neighbourhood. This situation is considered important enough to deserve further discussion in the following chapter, as such an approach to a subdivision as a privately financed residential project is none too common.

The preceding paragraphs represent the developer's requirements and indicate his awareness of the need for providing more than suitable building lots alone.

The following paragraphs represent the city, provincial, and other public requirements. These regulations and restrictions may indicate the increased need for subdivision control, since in the past not all designs have been developed with regard for the community in which they have been located.

With some exceptions, subdivisions in Calgary must be developed in accordance with the Province of Alberta Subdivision and Transfer Regulations, Regulation 185/60, 1960. These regulations are enforced by the Technical Planning Board of Calgary, which may approve or reject an applicant's proposed plan. To prevent any undue hardship, the applicant may appeal its decision to the Provincial Planning Advisory Board, and in the ruling, requirements may be waived or modified according to circumstance.

While the Alberta Regulations allow the design of a subdivision as a "street and lane" system, a "walkway and service roadway" system, or as a "street and utility rights-of-way" system, the City of Calgary requires the use of the "street and lane" system only. These lanes must be 30 feet wide to provide for all the services in the rear, and must be continuous from block to block. All streets must be designed with regard to traffic flow and pedestrian and vehicle safety. No cross intersections are allowed, not even of two minor streets, and any dangerous crossings must be eliminated. No block may exceed 1000 feet, no loop 1500 feet, and no cul-de-sac 300 feet in length. Each cul-de-sac must have a 50 foot turning radius and a 50 foot service right-of-way. Other streets may vary from 50 to 100 feet in width depending upon their future use.

The lots must be at least 55 by 100 feet in the laneless system with a minimum area of 5500 square feet. In the lane system, interior lots must be at least 45 by 110 feet, corner lots 50 by 110 feet, and the average lot area must be at least 5000 square feet.

The Calgary Public School Board desires large and well planned sites. They must be 7 to 9 acres in area for each school and its playground, or 9 to 10 acres in area if part of the site is devoted to public open space. No child should need to walk more than one-half mile to school.

The factors concerning the open space requirements will be discussed in the following chapter. As will be seen, there is a high standard to be met in the dedication of open space. However, the Board will grant a decrease in the required area, if the total amount of land taken up by streets, lanes, walkways, and reserves exceeds 40 per cent of the area to be subdivided.

There are opposing views concerning the need for back lanes in residential areas. The arguments for lanes include, among others, that unnecessary street traffic is eliminated; delivery vehicles are relegated to rear access points; costly pavement repair costs are eliminated with the "burial" of utilities under gravel surfaces; garbage and refuse containers are "hidden" in the rear of the lots; two access points are needed for each

lot, the one being from the street, the other from the lane; and that pole lines and wires must have direct access at all times. These arguments have little foundation in modern planning.*

Proper traffic engineering design will prevent excessive vehicle speeds. Modern delivery vehicles are more attractive in operation and appearance than in the era of horse-and-wagon deliveries. One may also wonder about the condition of the lanes' surfaces during and immediately after rain or snow.

In the gravel-surfaced lane system the utilities must still cross under the pavement at each lane and street intersection. Therefore the alternative method of "burying" the utilities under boulevards, wherever possible, is not uneconomical. The length of house connections will be less from street to home on minor streets. Overhead wiring may be hidden just as well along the rear lots within easements, and still have direct access, if and when needed. In fact, in a new subdivision, the costs of installing underground wiring, as opposed to the costs of the conventional system, deserve more study. In many instances, "same-time" excavations for all utilities may be done at a reasonable cost.**

*D.H. Webster, Urban Planning and Municipal Public Policy, (New York, 1958) p. 460, and The Community Builders Handbook, (Washington, 1960) p. 135-136.

**W.L. Peddie, "8-KV Underground System Provides....", Electrical News and Engineering, (Toronto, Dec., 1960) p. 56-59.

On the other hand, some planners and designers have been able to satisfy the wishes and desires of those persons who prefer to have lanes and those who do not in the same layout. Smaller lane widths are provided, of about 18 to 20 feet, and the utilities are buried in the streets. Thus the lane is devoted primarily to delivery and pick-up vehicles for all of the individual garages, whether attached or detached, must have a street or front entrance. However, the price paid for this purpose of providing concealed refuse containers and delivery routes is unjustified, as the lanes will take up some 4 to 5 per cent of the land area. Better organization of collection methods and improved container designs could make waste storage unobtrusive in a laneless area.

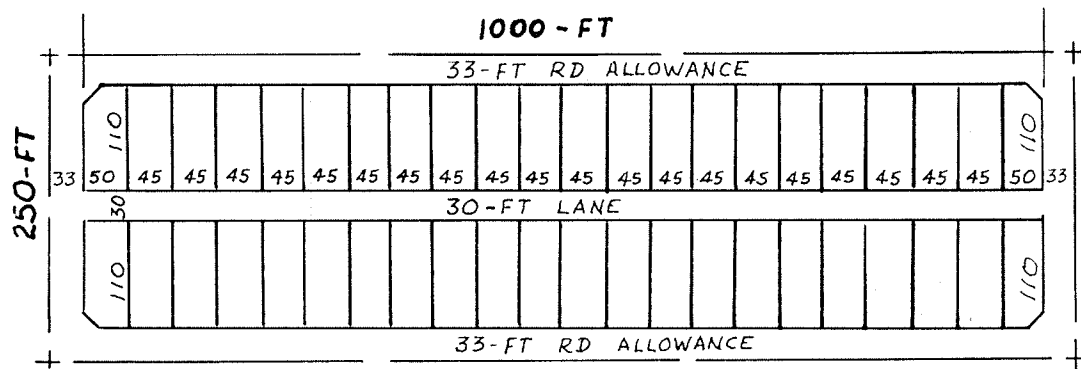
It is true that the development of a laned subdivision will produce slightly more lots per acre than would result from a laneless subdivision, provided that the lot sizes are as proposed by the regulations. Fig. 2 shows a comparison of the two systems and the densities obtainable.

From his personal knowledge of laned residential districts in the City of Winnipeg, the writer considers the potential accident hazard caused by the lack of visibility and the reduced manoeuvring space common to narrow lanes to be their worst feature. It is difficult to

impose speed restrictions, and impossible to improve driving conditions without expensive reconstruction. Most drivers are wary, but the unpredictable emergence of vehicles and children from garages and backyards into a car's path has caused many unnecessary accidents.

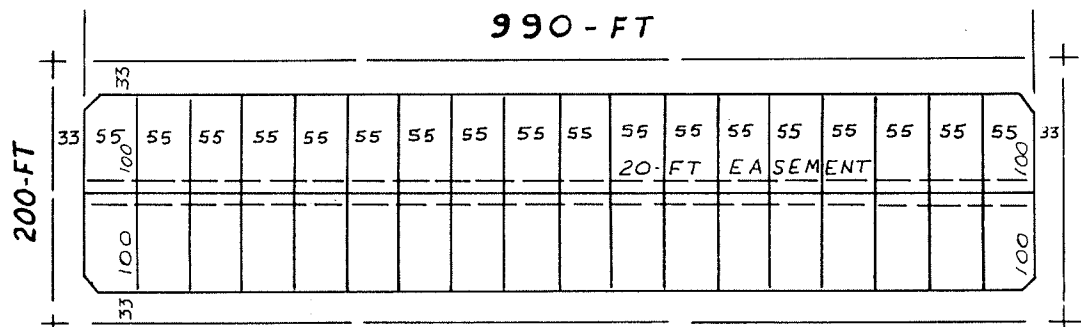
In conclusion it may be said that the city regulation demanding back lanes will not impose a financial hardship on the developer. Any difference in the final land and its improvement cost will be passed on to the lot purchasers. The benefits of a laneless design would more than make up for the increased costs. However, if the lot sizes were made more flexible as in the lowest diagram of Fig. 2, there would be no increase in price to the lot purchaser. If the developer presented a sound case for an appeal decision, with a more thorough market and housing study than is possible herein, it is probable that the Appeal Board would grant a change in the required minimum lot size regulations for a laneless subdivision.

FIG. 2



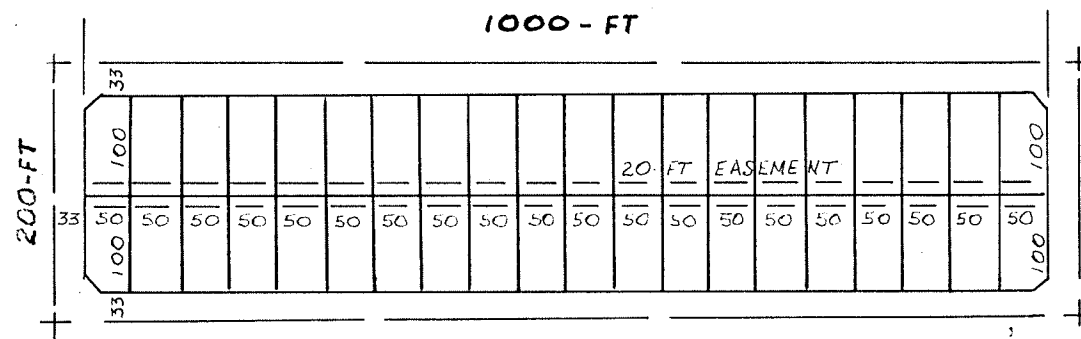
A

MAXIMUM UTILIZATION OF LOTS IN LANE
SYSTEM PERMITTED BY REGULATIONS.
GROSS DENSITY - 5.7 NET DENSITY - 8.7



B

MAXIMUM UTILIZATION OF LOTS IN A LANE-
LESS SYSTEM PERMITTED BY REGULATIONS.
G.D. - 5.7 N.D. - 7.9



C

A VARIATION NOT PERMITTED, BUT ONE THAT
WOULD PROVIDE MORE USEABLE LOT WIDTHS,
AND BE ECONOMICAL TO DEVELOPER, LOT
PURCHASER & CITY.
G.D. - 6.1 N.D. - 8.7

CHAPTER FOUR

COMMUNITY FACILITIES

The Alberta Regulations require the developer to dedicate 10 per cent of the subdivided land to open space, which is to be designated as "Community Reserve" in the plan. Inferior land, or land which otherwise could not be used for building lots, is not allowed to be included as open space. School sites and playgrounds must, of course, receive priority as open spaces. The land required for them will not normally amount to 10 per cent of the site area. The balance required may then be represented by any other kind of acceptable open space such as a park or a community green. The so-called "buffer strips" which may be required between two incompatible uses are also acceptable as open space reserves.

In view of the preceding statements, the developer has a fair amount of freedom with respect to the kind of open space he must provide. Naturally, he is most likely to exercise this freedom by giving priority to the kind of open space which will be commercially most advantageous. He is therefore likely to give preference to smaller open spaces that will increase the commercial value of the adjoining lots, rather than to larger parks for the benefit of the whole community.

The provisions for schools and buffer strips vary with the size of the subdivision. Ten per cent of the area of a small tract may include a school site and

little else. As the tract area increases, the 10 per cent requirement for open space will require additional community reserves to be dedicated. The developer will usually select small green areas to make up the balance. Consequently, even large subdivisions can appear without any community facilities and larger parks, because the school sites, buffers, and small greens have exhausted the minimum compulsory open space requirements.

The previous remarks apply largely to subdivisions which, according to zoning regulations, must contain single-family dwellings only. If, however, a higher density is permitted, when apartments and other multi-family dwelling types are used, the developer may include commercial establishments and some community facilities. This is not due to any public regulation, but rather the result of the fact that the developer can expect a higher return from such a subdivision. A part of this return may be due to the inclusion of a shopping centre larger in size than would be the case if only single-family dwellings were allowed. Such a shopping centre would be advantageously located close to the area of higher density. It may be advisable and economically feasible to locate the previously mentioned community facilities in the same area. These may consist of a hall, a club house, a skating rink, and a swimming pool, together with a sports ground large enough to

permit a baseball field. Although the arrangement varies, the facilities described above would not be out of scale in a large residential subdivision. The centres usually attract large numbers of people to such events as dances, games, and sports events. Regrettably, space is seldom provided for reading, quiet games, and hobbies.*

Churches, although they are an indispensable part of a neighbourhood, may not be provided for in the development, since the developer is not required by law to set aside sites for them. It would be difficult to estimate the required number and denomination of churches that will be needed. This explains why churches are found along main traffic arteries, or amongst commercial developments together with banks and shops of various kinds. Many developers have realized that such unsuitable environments for churches affect lot sales adversely and have endeavoured to incorporate specific church sites into the design. These sites do not make excessive demands on the land; usually one acre is an ample provision. There, in the community of homes, the churches acquire a better architectural status and harmony. As a planning and design principle, it is better to set aside sites for the churches when the subdivision is being designed, rather than to wait until a later date and then try to form a

*D. Cameron, Community Centres in Alberta, (Edmonton, 1946); A useful publication which classifies most of the space requirements of the various facilities of the Community Centre.

church site by combining a few vacant lots. The latter practice, though prevalent, has its disadvantages in that it usually brings forth objections from nearby residents on the grounds of the increased parking and traffic flow generated by the church at times of service. If, however, the sites are set aside at an early date and clearly marked in the design, those who do not like the proximity of the church to their future home could select a lot elsewhere.

Churches have sometimes been located next to shopping centres to take advantage of common parking space. Conflicts can arise in these situations and the arrangement is inferior. The architectural composition of such combinations is extremely difficult. Most neighbourhood churches are of necessity small, whereas shopping centres are large in terms of the amount of land they cover, and the combination will not likely form a satisfactory composition, neither by contrast nor by unity.

Neighbourhood parks are a desirable community facility, particularly in medium-quality developments, because they relieve the denseness of closely grouped houses on rather narrow lots. For reasons mentioned earlier, such parks are seldom provided. The notion that a school playground will function as a park can hardly be accepted as valid. Although classed as an open space,

the playground is an "active" area, and the presence of any landscape elements, except on the periphery, would conflict with its use. The park, on the other hand, is a display of landscape elements arranged in an appealing manner. It caters to all age groups and is not, nor should be, an active area. It may be adjacent to the playground to extend the unbuilt space, or it may be located as a part of the community centre and its elements. Various sources have recommended that such a park be at least two acres in size in a neighbourhood serving a population of 1500 persons.*

The designer cannot say with complete assurance that a particular green will be ideal for a particular use. It may well be that the persons who will use this facility may have alternative wishes in mind. For example, one group of houses around a small green may contain a large number of children who need the extra playing space, while another group of homes with a preponderant number of adults may use their park as a gathering place. As the ownerships change hands, and as the residents grow older, new uses for the greens will develop.

For these reasons the plans herein do not label greens with any specific titles such as "toddler-lots", or "walkway and benches", and so on. Instead a flexible plan for community recreation was envisaged, and a variety

*D.H. Webster, Ibid, p. 167-169; and
The Community Builders Handbook, p. 105

of shapes and sizes of open spaces was provided. At the same time, certain greens were designated to ensure that the necessary community facilities should not be forgotten. These were the previously mentioned neighbourhood park and school playground sites. Undoubtedly, the Calgary School and Parks Board will assist the developer with respect to the planning of the proper facilities and landscape treatment involved.

The grouping of the community facilities is a matter of considerable importance in the neighbourhood. As the facilities consist of spaces as well as buildings, a reasonable balance between the two elements should be achieved. With respect to the buildings, the difficulty is that they are almost exclusively one storey in height. This limitation has an undesirable effect on their formation into an architectural composition. Moreover, the necessity of having to provide parking spaces close to these buildings may result in wide gaps between buildings. Such interruptions may appear as unfortunate "holes" in the grouping. Yet one of the basic principles of civic design is the fact that in a composition the spaces formed by the buildings are aesthetically as important as the structures. Then, of course, there is another limiting factor, namely the small number of buildings with which to form a group.

If some apartments are located together with the community facilities, in or near the centre of the neighbourhood, the entire group may achieve the desired bulk; on the other hand, the invasion of too many apartment blocks in this area is likely to destroy the scale of the neighbourhood, which in this thesis is predominantly an area of single-family dwellings. Care must also be taken in the siting of the apartment buildings, which should not be located too close to the single-family dwellings. Generally speaking, a row of apartments along one side of a street will lower the real value of any single-family homes along the other side.

This situation is sometimes unavoidable, and the tension between these two types can be relieved by siting the apartment blocks perpendicularly to the street with sufficient set-backs from it, and by arranging the single-family block ends in such a way that the homes face or front upon another street.

The apartments are usually repetitious in appearance and plan arrangement, for reasons of ease of construction. Therefore the designer must endeavour to break the monotonous appearance ordinarily inherent in these structures by grouping them in a pleasing manner, maintaining at the same time as extended an outlook from each building as the site and circumstances permit. Needless to say, the apartments should not be "mixed" with

the community facilities, although it may be preferable to locate them together with these facilities in the same general area. One must emphasize the need for the judicious planting of trees and shrubs in this area, in a manner that would enhance the effects of the architectural composition formed by the group of buildings.

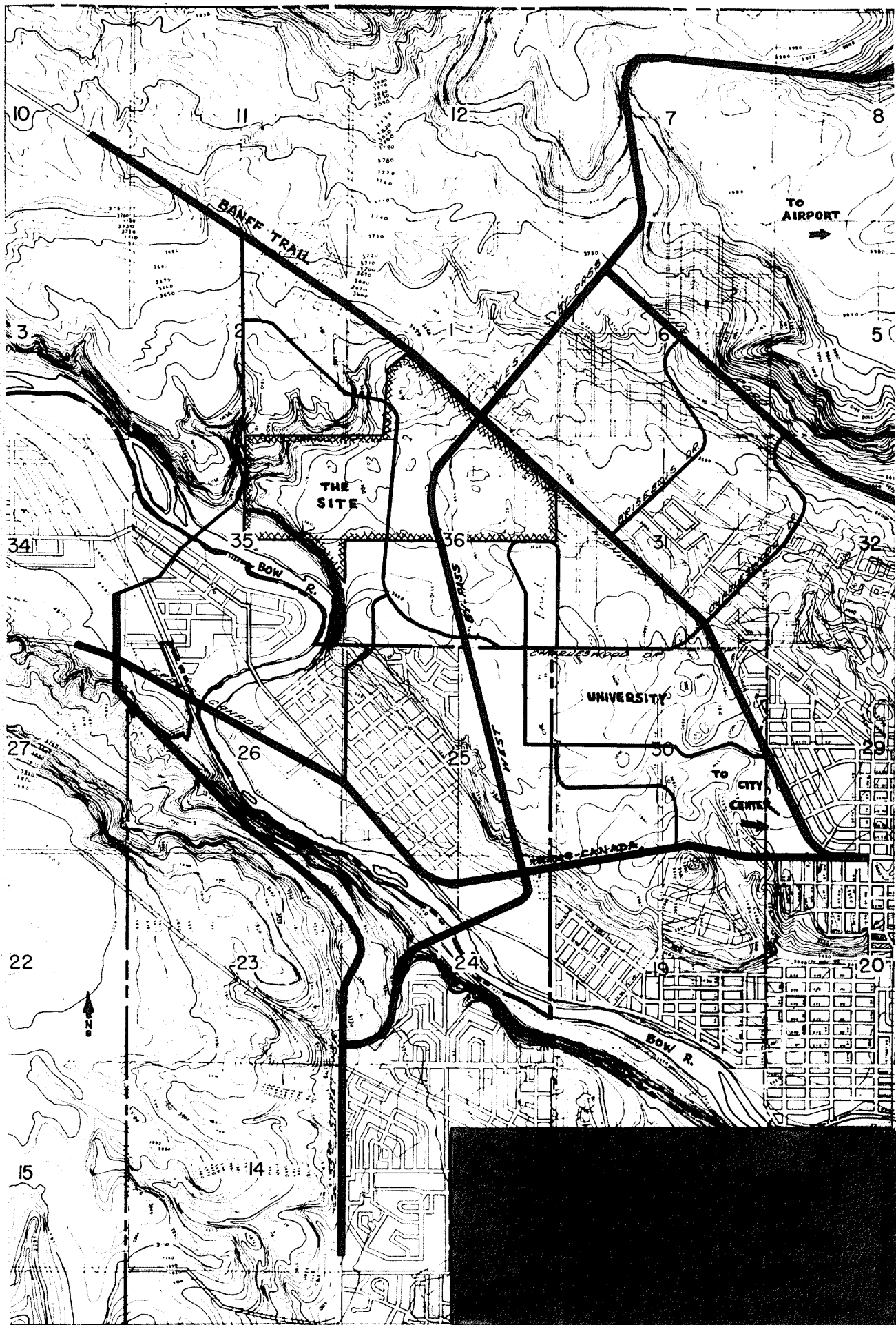
CHAPTER FIVE

THE PLAN

The West By-pass road as proposed by the Calgary Technical Planning Commission can be regarded as the most important single factor in the plan. The road seen in Fig. 3, utilizes the existing bridge between the Trans-Canada Highway and 53rd Street S.W., then runs north across Section 36 and across the Number 1A Highway.

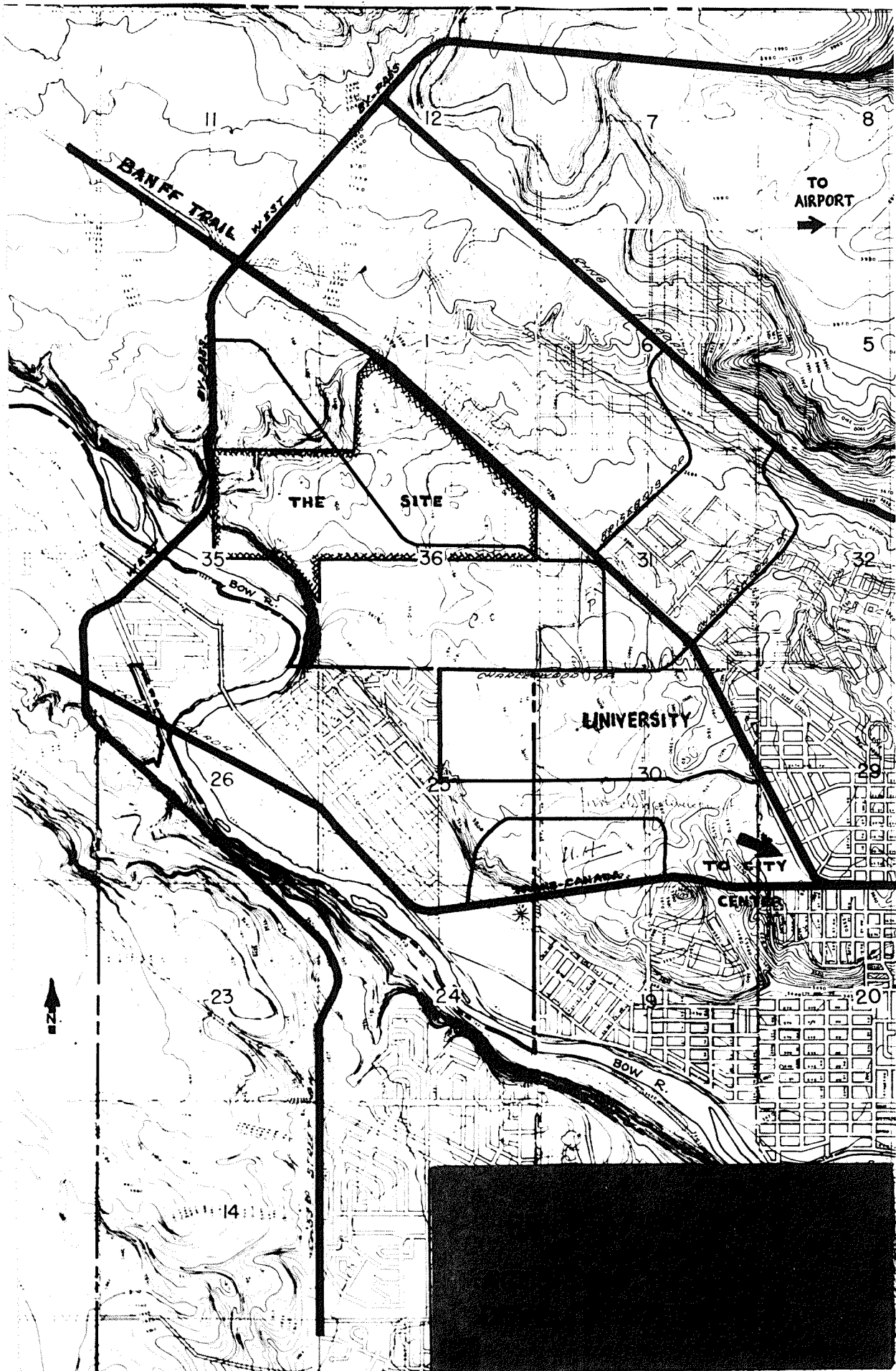
The developer claims that he would suffer considerable hardship if the road were to cross his land, thus splitting the site and reducing its value for the development of a large-scale neighbourhood, because the continuity of the area would be severed. He maintains that the road as a traffic artery 132 feet wide would act as a barrier within the neighbourhood and would conflict with the direction of traffic to and from it. This traffic will operate in the south-east direction, using the Number 1A Highway as the main arterial channel between the site and the city centre. One must admit that if the road were built in the proposed alignment, the local traffic generated by the site development would be affected.

The seriousness of the situation, however, would vary depending upon the number of cross points or intersections permitted along the proposed By-pass. If no intersections were allowed within the boundaries of the site, the worst condition would result; the west part of the site would be isolated and ingress and egress routes would



have to be both devious and long. If some intersections were allowed, or if intersections at 1000 foot intervals were permitted as sometimes is the case along arterial highways, the seriousness of the situation would be lessened, yet would remain unsatisfactory to the developer. The writer believes that if no intersections were allowed the developer is likely to view the condition as so unfavourable as to force him to abandon the idea of developing the site; he is already uncertain as to the possibility of producing a satisfactory design even if the intersections at 1000 foot intervals are allowed. The developer also suggests that the By-pass as proposed will affect unfavourably all residential developments west of the Number 1A Highway, both on his site and in the vicinity.

In an appeal to the Provincial Planning Advisory Board, it is likely that the developer will not question the desirability of the By-pass as such, but that he will endeavour to make a case for its relocation. He believes that a better location of the route is possible, as shown in Fig. 4. In this alternative solution, the future neighbourhoods within most of the areas concerned would not be undesirably affected because the route would run along the edge of an extensive ravine, which may well be regarded as unbuildable for the purposes of any residential development. He also suggests that the original location of the



By-pass, as proposed by the Technical Planning Board, will cross several tracts of land, his own included, and spoil several large residential developments.

Having briefly stated the developer's point of view, his intentions, together with his suggestions as to how the allegedly untenable situation could be remedied, the writer wishes to present the views of the Technical Planning Commission. At this point it would be pertinent to point out that no correspondence exists between the developer and the Commission on the subject of the By-pass. Numerous meetings between them have taken place and the statements made at them are the only sources of information available.

Needless to say, the writer has received his information second-hand, hence the risk of possible misinterpretation. However, the Commission had this to say by way of justifying its proposal; the need for the By-pass is unquestionable. The proposed location is the only feasible solution considering the contours of the land elsewhere in the north-west part of the city. Alternative solutions, including the one suggested by the developer, would be more costly; analyses by the City Traffic and Engineering Department revealed that gradients of unacceptable magnitude or excessive earthwork costs would result. Furthermore, reconstruction of an existing bridge inadequate for heavier use would be necessary if the

developer's proposal were accepted. In addition, the By-pass would then run through an established community located in the bend of the Bow River south of the site. With respect to the objection that the proposed highway would bisect the developer's neighbourhood, the Commission pointed out that other neighbourhood formations would be possible within the areas concerned and these alternative areas would then be bounded by the By-pass. Of course, these alternative areas would include land beyond the limits of the developer's property.

This concludes the presentation of the opposite points of view regarding the By-pass. The writer does not wish to use them as a basis for any further discussion aimed at finding out which of these views is correct. Such a procedure is not advisable since complete information is not available. The views have only been presented because they form a part of the project procedure and development and it was felt for this reason that they ought to be recorded.

Regardless of the outcome of the dispute between the developer and the Commission, the matter of the By-pass poses an interesting problem. Assuming that the developer had purchased the land before he could have any knowledge of the location of the proposed highway, should he take legal action against the city on the grounds of undue hardship which he is likely to suffer

if and when the By-pass becomes approved officially?

First of all one must assume that the developer would receive compensation for the amount of land taken up by the By-pass. The public authority, the city in this case, would use the powers of eminent domain for the expropriation of the land. Ordinarily, the authority takes property by eminent domain because it is useful to the public. However, private property cannot be taken for or applied to public use without just compensation being first paid or secured. Such a compensation means the full and perfect equivalent in money of the property taken, as the financial position of the owner must not be reduced or lowered as a result of the exchange.

There is little doubt that an urban arterial road does represent public use. One can also state that the preceding remarks relating to just compensation have been generally regarded by the courts of law. Therefore, in this case, if the developer did not receive just compensation, he would find no difficulty in receiving a satisfactory compensation in the law suit.

Having been duly compensated for the property taken away from him, would it be advisable for the developer to claim that he has suffered undue hardship and sue for damages? The writer does not wish to create the impression that he knows the law, for indeed almost the opposite is the case. Nevertheless, the legal impli-

cations of eminent domain can be described as a part of planning procedure and practice.

It has been held in a great majority of cases that if a strip, however narrow, of the owner's land is taken, damages are to be awarded for the injury done by the location, construction, or use of the public facility to all adjacent land. In other words, in addition to the value of the land taken, the land owner is entitled to recover damages growing out of the use for which the land is taken. In this case, the only ill-effects growing out of the use of the By-pass would be the increased amount of traffic along the highway and the resulting noise and dust. Yet this kind of damage, if it is to be called damage, would exist just as well if the location of the By-pass were along the side of the owner's land instead of across his land.

It often happens that when land is taken, an area is left of such size or shape as to be worth less proportionally than it was as a whole, and this diminution of value is often treated as one kind of damage resulting from the taking. It would be extremely difficult to prove any diminution of value in this case as a result of the By-pass splitting the land in two parts. The smaller of the two sections, the eastern part, would still be left large enough to accomodate a small neighbourhood, with its own school and facilities.

The preceding statements point out the fact that no convincing grounds for damages exist in this case. At the time of writing, the situation with respect to the By-pass location stands as has been described in the text.

Having recorded the conditions of the site, the requirements relating to it and the project, as well as the intricate situation of the By-pass, the writer feels that he has now reached the stage when the planning of the site should begin. He has decided that in this case the best policy is to prepare two plans, which shall hereafter be referred to as Plan A and Plan B. In Plan A it will be assumed that the By-pass will be located west of the site as in Fig. 3, and in Plan B the By-pass will be located on the site as in Fig. 4. It is believed that this procedure is the best way of assessing the implications of the By-pass, as it provides an opportunity for making useful comparisons, which will be presented in the concluding chapter.

In addition, in Plan A a laneless subdivision will be presented whereas in Plan B lanes will be used. By this further variation, a basis for a comparison between the two forms of residential layout will be given and the conclusions drawn from it should supplement some of the statements made earlier.

Both plans will be approached with the idea of practicality in mind, and an endeavour will be made to

devise a suitable scheme for the site rather than to superimpose a preconceived layout idea on it. In this connection the writer rejects the superbblock layout. His reasons for so doing will now be presented in some detail.

The superbblock is an introverted type of residential neighbourhood with an interior park, and with an exterior street system of bays or culs-de-sac branching from and to a periphery road system. The arrangement is such that some of the houses on the minor streets overlook the interior park and its footpaths which give the pedestrians access to the school and shops. Clarence Stein and Henry Wright, the authors of this concept, used the superbblock in their design of Radburn, New Jersey, in 1929. The superbblock concept created a favourable impression in planning circles during the ensuing years and its principles are reflected in a number of Canadian subdivisions with a varying degree of success. One may go as far as to say that many designers have considered it almost their professional obligation to use the superbblock whenever possible.

The purpose of these remarks is not to belittle the desirability of this type of layout device. On the contrary, the superbblock, if applied intelligently under suitable circumstances, offers satisfactory results.

One feels, however, that certain objections to its use ought to be mentioned. Perhaps its most serious disadvantage has been stated by some members of the Urban Land Institute who feel that this type of design calls for communal action and close co-operation of individual families over a long period of time. These prerequisites are not manifest in average home buyers and as a result, there is likely to be difficult resistance on their part to such a communal scheme.* When describing the super-block Stein admits that the preservation and maintenance of the inner block or park requires an unusual form of community organization and good-neighbour policy.

A variation of the Radburn design exists in Wildwood Park in Winnipeg. As compared to Radburn, loops were used as service streets rather than culs-de-sac. The site is a partially wooded area of 87 acres contained by a bend of the Red River. Footpaths have been provided through the interior park and vehicular traffic moves on the encircling street loops on which there are no sidewalks. Unfortunately, from the streets there is no view of the house fronts or the interior park as in Radburn, particularly as far as the houses inside the loops are concerned. Also, there is no orderly arrangement of the backs of the houses, and the detached garages add to the back lane appearance.

*The Community Builders Handbook, p. 150-151.

The site in this thesis, particularly in the north-east part, is so shaped as to render the use of the superblock quite difficult. One of the basic planning principles is that a layout should not be forced on the site, but rather that the design should take its inspiration from the idiosyncrasies of the site, and should be "tailored" to it.

The requirement of back lanes by the City of Calgary would be a serious obstacle in the use of the superblock. Either the culs-de-sac or the loops within the superblock would be separated from the interior parks by lanes which would create a situation both undesirable and foreign to the concept of the superblock.

As implied earlier, back lanes can be regarded as superfluous in the design of a modern subdivision. Nevertheless, they do not preclude the achievement of a satisfactory neighbourhood. In the city of Edmonton, where the requirement of back lanes exists, the city planner Noel Dant designed and initiated the development of some of the best neighbourhoods in this country approximately seven years ago. None of these neighbourhoods follows the superblock pattern.*

In Plans A and B the greens will be employed as much as possible for the purpose of grouping houses

*V.J. Kostka, Neighbourhood Planning, (Winnipeg, 1957)p. 31-34, and The Urban Land Institute Technical Bulletin No. 40 (Washington, 1961) p. 14-15.

around them. Dean Perkins of the University of Pennsylvania, has stated that while the small social groupings of fifteen to thirty families around a green should be the essential elements of the community, they have almost been universally neglected in present day subdivision plans.

The greens are small enclosures which provide the necessary relief from the overpowering influence of the streets built up on either side. Apart from their attractiveness as open spaces, the greens allow for an extension of outlook from the houses. Although they are public reserves, they can easily be made small enough to be sufficiently private. They can be variegated in both appearance and function. One green may be an informal playground for pre-school children, another may be arranged as a quiet park with trees, another still an ornamental garden. According to the dictum that intimate urban space enclosures foster social contacts, the greens should be effective in promoting friendliness among the neighbours. However, as discussed earlier, the residents themselves should be permitted to use these spaces as they see fit.

With respect to the street layout for either plan the objective must be to differentiate between the road type and its layout. In other words, a minor street



must never invite alien traffic movement or speed by its layout; its primary function is that of providing access to abutting property. A major street must not be devious or narrow; its function is that of facilitating traffic movement.

Many regulations have been drawn up without this key objective in mind, and the resultant road regulations for widths and layouts have proven to be costly to the developers and to the communities. The Alberta Regulations, however, do recognize this differentiation and provide a reasonable standard of road widths. The Plans will follow this standard and the safety requirements mentioned previously. The road widths to be used are; urban highway, 132 feet wide; through-town artery, 100 feet wide; collector, 80 feet wide; feeder, 66 feet wide; minor, 56 feet wide; cul-de-sac, 50 feet wide; and a service roadway in lieu of a lane, 30 feet wide.

With respect to the utility services, no final or detailed engineering calculations will be attempted. However, certain utility design features should be considered before any layout is attempted.

Concerning the power and communication facilities, the lanes or easements provided for them should be continuous and preferably straight in alignment, rather than curved. Every change in alignment greater than 5 to 7

degrees will require an anchor or guy structure. If the continuity from block to block is not maintained, the lines will have to be "dog-legged" and the number of poles will increase. If at all possible, the major portion of the system should be in the form of loops, with few dead-ends or "feed-offs", so that in time of failure or repair work, power may be fed in from either end of the system.

Considering the sewerage system, it is preferable to follow the general contours of the land to prevent excessive excavation during construction or repair, and to reduce the need for pumping stations. The construction of the sanitary system will be more economical if the sub-mains and trunk sewers are long and few in comparison to the lengths and numbers of the laterals, not vice versa. Considerable savings in the design of the storm system will result from careful utilization of the natural flow of the areas concerned.

There are a great many other factors, minor in nature, concerning the above utilities, the water distribution system, the fire-fighting system, the gas mains, and so on. A detailed engineering study would deal with them in the usual manner. The writer is confident that the plans show the utmost concern for the major factors, such as topography, alignment, and continuity, and that

as a result the design and construction of the utility services will be economical. Such factors as lot shapes, types of intersections, park locations, road widths, and so on, already discussed, will be of great importance to the final layout because of their architectural implications. As always, if the architect does not consider function, compromises must be made. Without them, the layout may be uneconomical to service, or the services may create untenable architectural situations.

Plan A

This design uses the "street and utility rights-of-way" system, as suggested by the provincial regulations. With the By-pass Highway located west of the site, the development has taken the form of one continuous neighbourhood with its own network of major collector and minor feeder streets.

The collector provides two points of access to the site; one in the south-east, the other in the north, both of which are located on the Banff Trail. When the collector is extended further to the west, an additional point of access will be provided via the By-pass. All of the intersections are of the "T" form, and a number of access roads have been planned to connect the neighbourhood with the surrounding areas.

The community facilities have been concentrated in a large and central location, readily accessible to and from all parts of the neighbourhood. This area contains the shops, the community centre, two churches, several apartments, a community park, and one school and its playground. An additional school and playground have been located in the western portion of the plan to meet the requirements of the development and the regulation that no child should walk more than one-half mile to and from school.

In the majority of cases, the lot sizes are 55 by 100 feet, although certain lots situated along the major arteries and the site boundaries have been given a depth of 120 feet to provide the necessary buffer space. The blocks, therefore, average 200 to 220 feet in depth.

The focal points for many groups of homes are small greens which have been liberally distributed throughout the development. The areas without greens are generally located close to the community facilities provided by the centre.

The "exclusive" area along the ravine contains large lots with excellent views. Certain spaces along the ridge have been deliberately left open to provide access to the ravine for other residents adjacent to the area.

In this plan, the rear lot lines have been

aligned in straight segments, continuous from block to block, to provide an economic and unobtrusive overhead service layout. The underground services would be located within the street rights-of-way.

Plan B

This design uses the "street and lane" system as required by the city regulations. In this plan the By-pass is located on the site, and splits the development into two neighbourhoods. For simplicity, during the remainder of this discussion the eastern neighbourhood will be referred to as "Area E", while the western neighbourhood will be referred to as "Area W".

Since the developer is likely to build about three or four hundred homes during the first year, and a like amount in each succeeding year, the entire project will be completed in about four years or less. However, the By-pass will not likely be completed for some time. This delay in construction time is of primary importance to the design, for the success of the project will depend upon the degree of integration between the neighbourhoods and the By-pass during all the various stages of construction.

Plan B presents the complete project which allows for its various development stages. When the neighbourhoods are completed and the By-pass is still

in the planning stage, Area E and Area W will use the collector system to reach the Banff Trail at the two locations shown. For this stage it was felt necessary that a continuous, looping collector be provided. When the By-pass is completed, the traffic load on Area E will be reduced, for Area W will use the By-pass itself as its main exit and entrance artery.

Several solutions for the design of the property abutting the By-pass were considered and rejected before the final choice was made, and these will be discussed in the following chapter. Suffice it to say herein, that the lots along the By-pass are deep enough to provide for a 30 foot service road if such is required by the city.

The street layout in each neighbourhood is similar to that of Plan A, with a definite distinction between major and minor rights-of-way widths provided. Excluding the two necessary cross intersections along the By-pass, one of which may require traffic signal control in the future, all intersections are of the "T" form. In view of the By-pass, only one access road to the surrounding areas is furnished.

The community facilities are concentrated in Area E because the promotion of the entire development will depend upon the success of the initial stage. An additional commercial area may need to be located in Area W for its exclusive use. If this is so, a new design

of the central blocks in this area would be necessary, for this would be the logical location of such facilities.

In the majority of cases, the lot sizes are 51 by 110 feet; and with the 30 foot lanes included, the block depths become at least 250 feet. As in Plan A, certain lots have been provided with an extra buffer space and are 120 feet deep. The lanes are continuous and aligned for the location of all the services, both underground and overhead. However, some easements will be necessary in the exclusive area as lanes are not contemplated therein and a relaxation of the lane requirement would be necessary.

An alternative design for Blocks 1 to 3 is shown in the upper right-hand portion of Plan B. This scheme would provide some additional lots because of the smaller amount of road area required and the better utilization of the triangular parcel. On the other hand, sixteen of these lots would then face the property across the eastern boundary road, outside of the site area. If the future development of this off-site parcel can be restricted to a land use compatible with residential use, then the alternative scheme should be chosen. However, if the parcel is allowed to be developed as a highway commercial property, or if no definite land use restrictions can be secured, then the lots should be as shown in the main body of the plan, backed up to the boundary.

Land Use Classification of Plans A and B

The presentation of Plans A and B would not be complete without an analysis of the land uses as proposed by the designer. Such an analysis follows in Table 1 which compares the amounts of land devoted to community reserves and facilities, streets and lanes, and the resultant net and gross densities.

When the designs were begun, the official requirements to be met were the open spaces and the streets and lanes. Other facilities, such as a commercial development or a community centre, could only be provided if the "load" on the land imposed by the official requirements permitted them. Therefore, to maximize the utilization of the site for residential development, the designer had to minimize the only remaining variable, namely, the amount of land to be used for public rights-of-way.

Thus it is interesting to note from Table 1, that the amount of land left for residential development in Plan B is 7.6 per cent less than in Plan A. This loss of potentially exploitable land may be attributed to one aspect of the layout, the use of lanes, which in this case amounts to 7 per cent of the area. However, the amount of land used for streets alone in Plan B is less than in Plan A, while the total amount of land used for open spaces and community facilities is almost the

same in each plan.

The resultant decrease in the gross density, i.e., the loss of 0.4 lots per gross acre or some 180 lots, in this subdivision will no doubt mean that the developer will either receive a lower total return from his investment, or that he will increase the individual lot prices.

TABLE 1

LAND USE CLASSIFICATION FOR PLAN A AND PLAN B

CLASSIFICATION	PLAN A	PLAN B
Community Open Space		
School Sites	18.0 acres	21.4 acres
Community Reserves	<u>22.2</u> "	<u>26.5</u> "
	40.2 "	47.9 "
	9.8 %	11.7 %
Community Facilities		
Church Sites	2.5 acres	2.6 acres
Shopping Center	5.0 "	2.7 " *
Community Center	<u>10.0</u> "	<u>6.0</u> "
	17.5 "	11.3 "
	4.3 %	2.8 %
Streets and Lanes		
Urban Highway	none	8.6 acres
Major Roads	30.0 acres	26.8 "
Minor Roads	64.5 "	58.2 "
Lanes	<u>none</u>	<u>30.5</u> "
	94.5 "	124.1 "
	23.0 %	30.2 %
Residential Areas		
Apartment Sites	7.0 acres	7.0 acres
Single-Family Lots	<u>250.8</u> "	<u>219.7</u> "
	257.8 "	226.7 "
	62.9 %	55.3 %
Number of Lots	1672	1484-1491
Net Density	6.6	6.7
Gross Density	4.0	3.6

* This figure represents the shopping center area of the eastern neighbourhood. If the western neighbourhood can support a separate shopping center, then the land needed for it will be taken from the school site or community reserve areas.

CHAPTER SIX

CONCLUSIONS

Considering the previous discussion of the By-pass and the back lane requirements, the writer considers Plan A superior to Plan B. However, these requirements cannot be considered entirely detrimental in the case of Plan B for the By-pass would provide certain advantages to the future residents and the lanes, apart from their usefulness, would provide more buffer space between the rears of the homes. It is the limited flexibility in design imposed by the lanes and the "splitting" effect of the By-pass that have created the unfavourable restrictions in Plan B.

For example, with lanes, the required block depths of 250 feet are unwieldy in the northern portion of the site where the boundaries are irregular. The laneless blocks, only 200 feet in depth, are more adaptable, and a much greater variation in their layout was achieved throughout the area.

The By-pass has been sufficiently discussed except for the matter of the design of the abutting lots. If these were backed up to the By-pass, the lanes and the rows of overhead service wires would be visible to passers-by, and have an undesirable effect on the appearance of the subdivision. Another solution would have been to provide culs-de-sac or bays along the highway. This would not only isolate the areas on either side of the

road, but it would also destroy the traffic efficiency of the By-pass as an arterial highway. Plan B permits a more economical layout of services and results in a better subdivision appearance. The lots are deep enough for a service roadway to be built when it is needed, or for parking bays for guests to be established while the lot owners use the back lanes to reach their garages.

It may be assumed that the city would permit the developer to build and use a certain portion of the By-pass as an access road to the lots located along it. It is unlikely, however, that the developer would build the road as far as the Banff Trail; nevertheless, the fact that the link to the Banff Trail is needed may speed up the construction of this part of the By-pass by the city. If that materializes the subdivision would be provided with an additional, and choice, gateway.

The previous remarks illustrate the designer's attempt to capitalize on those advantages in Plan B that the By-pass offers. It is realized that the By-pass situation will greatly handicap vehicular and pedestrian movements from one side of the subdivision to the other. It may then be necessary to provide certain duplicated commercial and community facilities.

In Plan A the future extension of the collector road westward to the By-pass is likely to encourage alien

traffic to use this road as a short-cut through the neighbourhood. Although it was necessary to retain this road in the plan because it formed a part of the developer's proposal for the relocation of the By-pass, the writer changed its alignment and length in order to reduce its usefulness as a "speedway". In addition, the more useable and manageable block sizes have permitted a greater range of shapes and lengths which in turn enabled a variegated design. Variety in blocks, their shape, position, length, and so on, counterbalances the monotony which is bound to result from the usual repetition of only a few house plans by the contractors these days.

Plan A is a more economical layout, not only for the developer, but for the future residents who ultimately pay all construction and maintenance costs. Most important, however, is that the plan offers considerable protection from such deleterious influences as traffic and noise by providing a greater number of secluded areas.

It may be noted that the thesis was entitled, "A Residential Subdivision...", rather than a "Neighbourhood Design...", and that throughout the text the term "neighbourhood" has never been completely defined, although it has been frequently used. C.S. Perry in

1928 introduced the concept of the neighbourhood which he described as a group of families large enough to support a school or other community facility, and living in a contiguous area bounded by, but not severed by, an arterial road.*

Such a concept has lost some of its validity in our modern and mobile society. It is now common for a family to know only the immediate neighbours, as the majority of the family's friends usually live elsewhere in the city. Certainly, it was impossible for Perry to foresee the exchange of the television set for the social contact and the "Sunday drive" for the afternoon walk.

The neighbourhood as a planning unit has not so far taken any firm hold in Canadian cities. Seldom have the provincial or municipal regulators recognized it as a basis in residential planning.

On the other hand, it may be reasonable to assume that a residential area, unbroken by such sharp physical barriers as arterial roads or railway lines, and equipped with suitable community facilities, will generate social consciousness and that the residents will identify it as a community. A further social bond may well result from the layout in which streets, blocks, and lots form an integrated composition enabling the arrangement of houses in pleasing, variegated, and secluded groups as much as

*C.S. Perry, Neighbourhood and Community Planning, Regional Survey of New York and Its Environs, Vol. VII, (New York, 1929).

possible. The foregoing is the writer's interpretation of the neighbourhood which he has adopted in this thesis as a basis for his subdivision designs.

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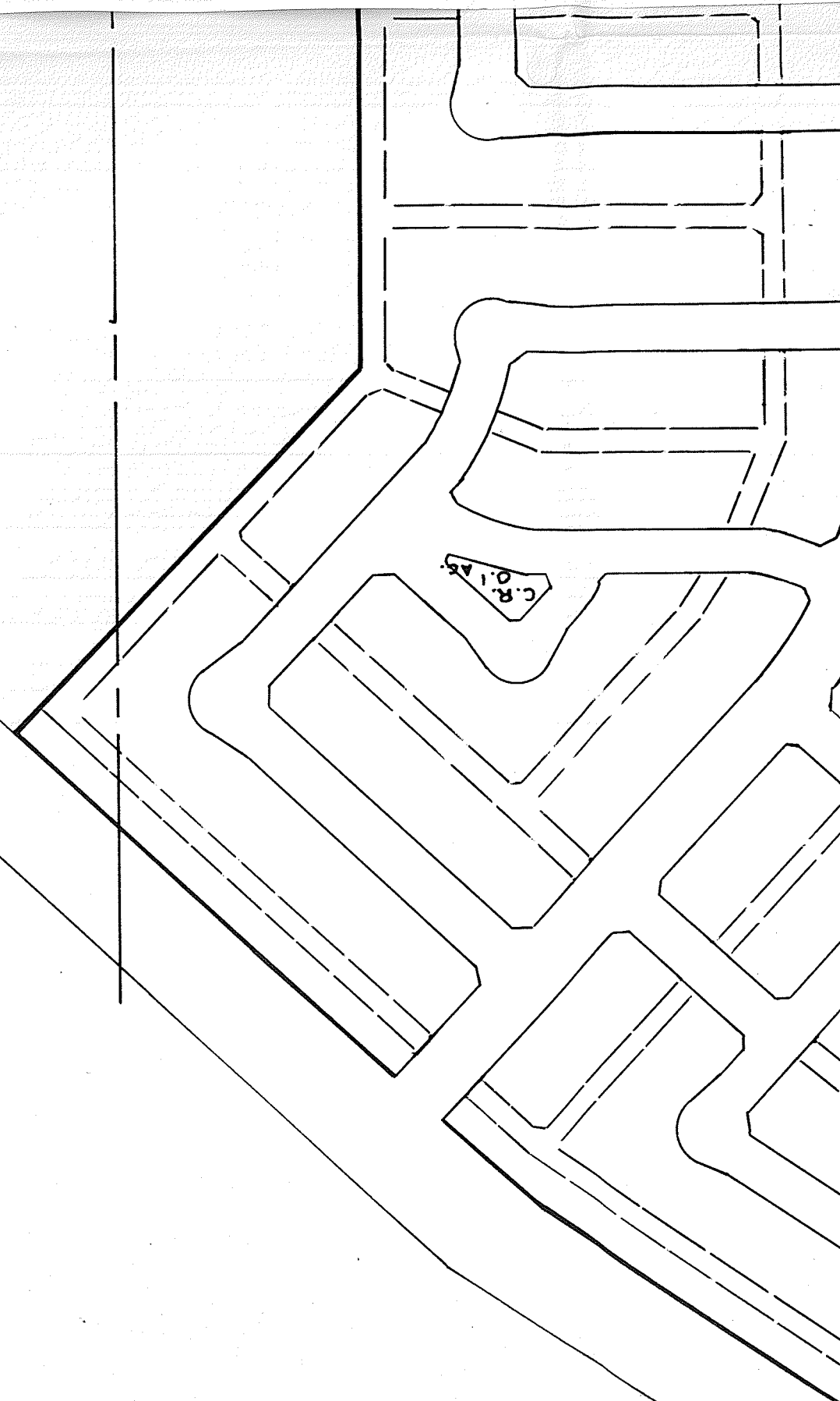
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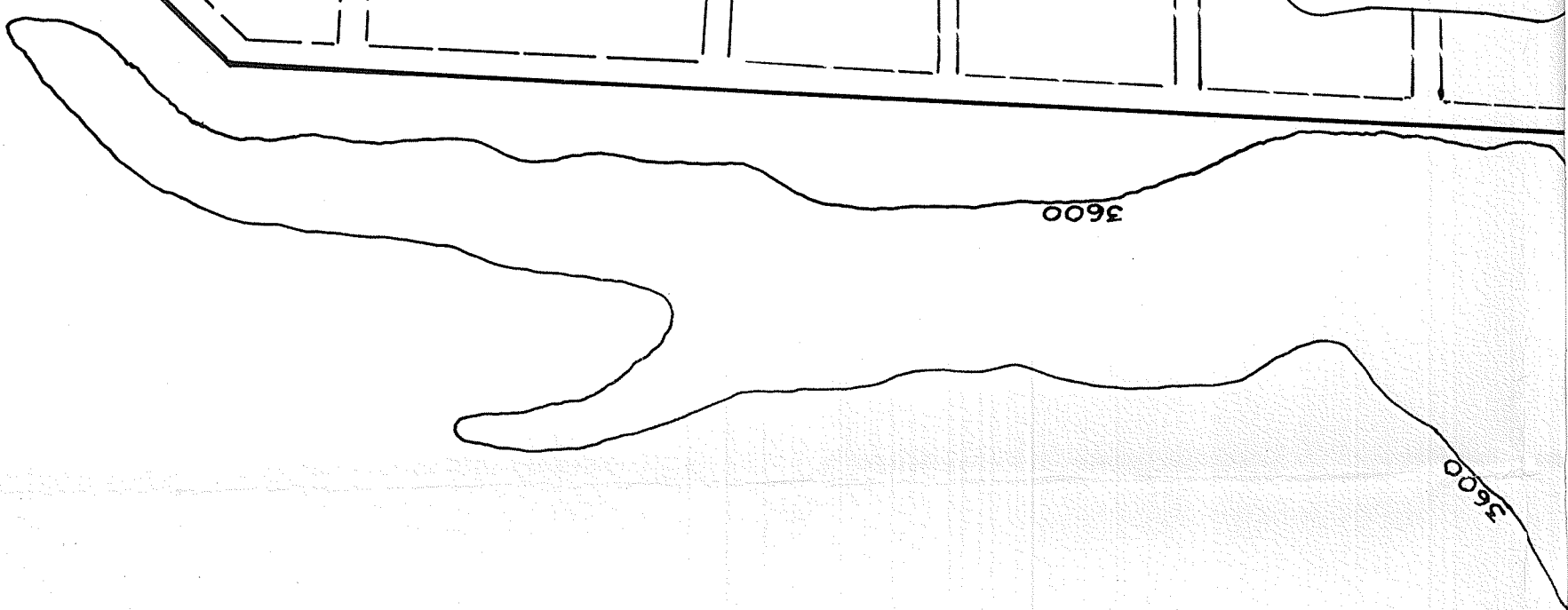
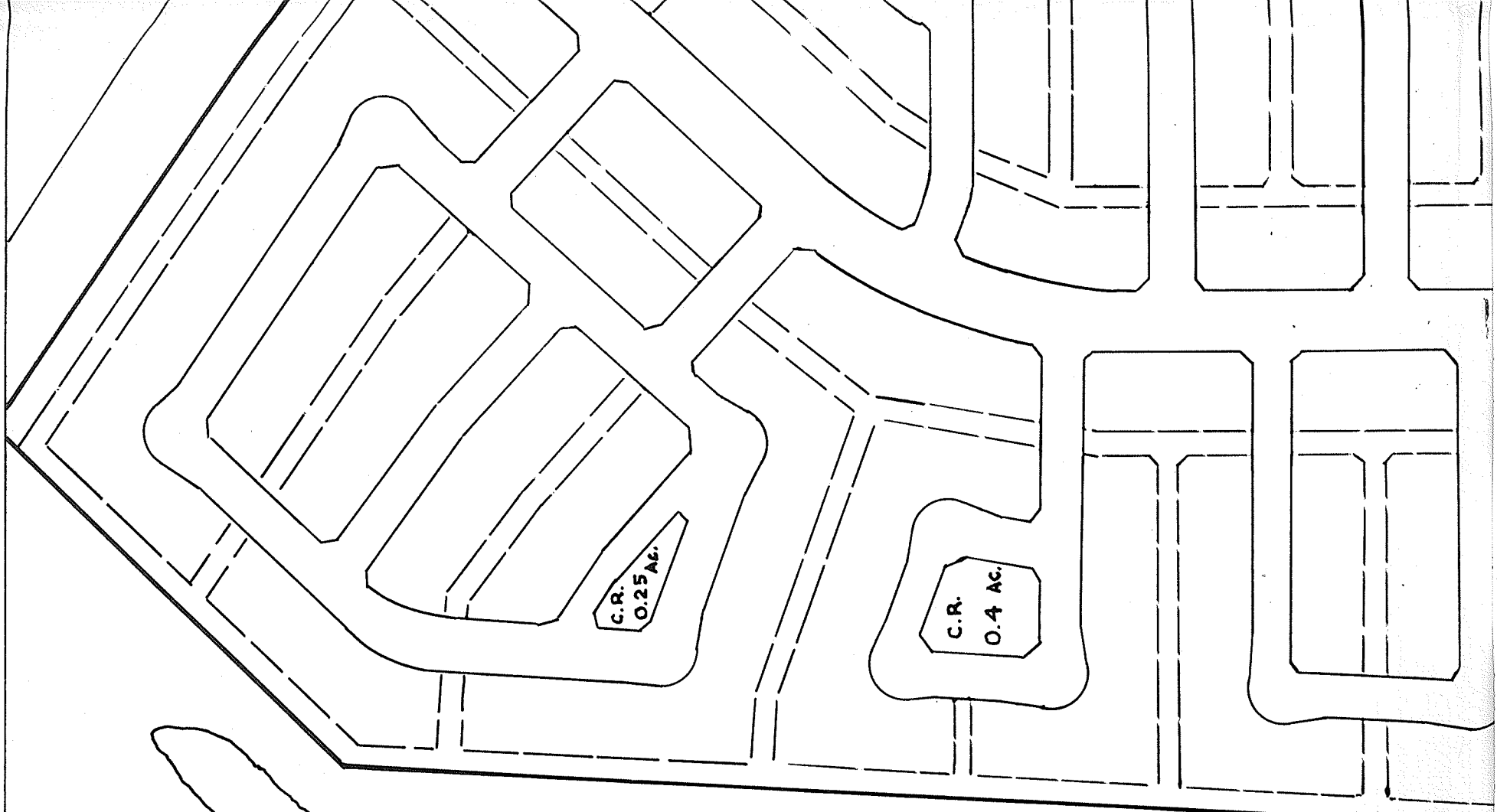
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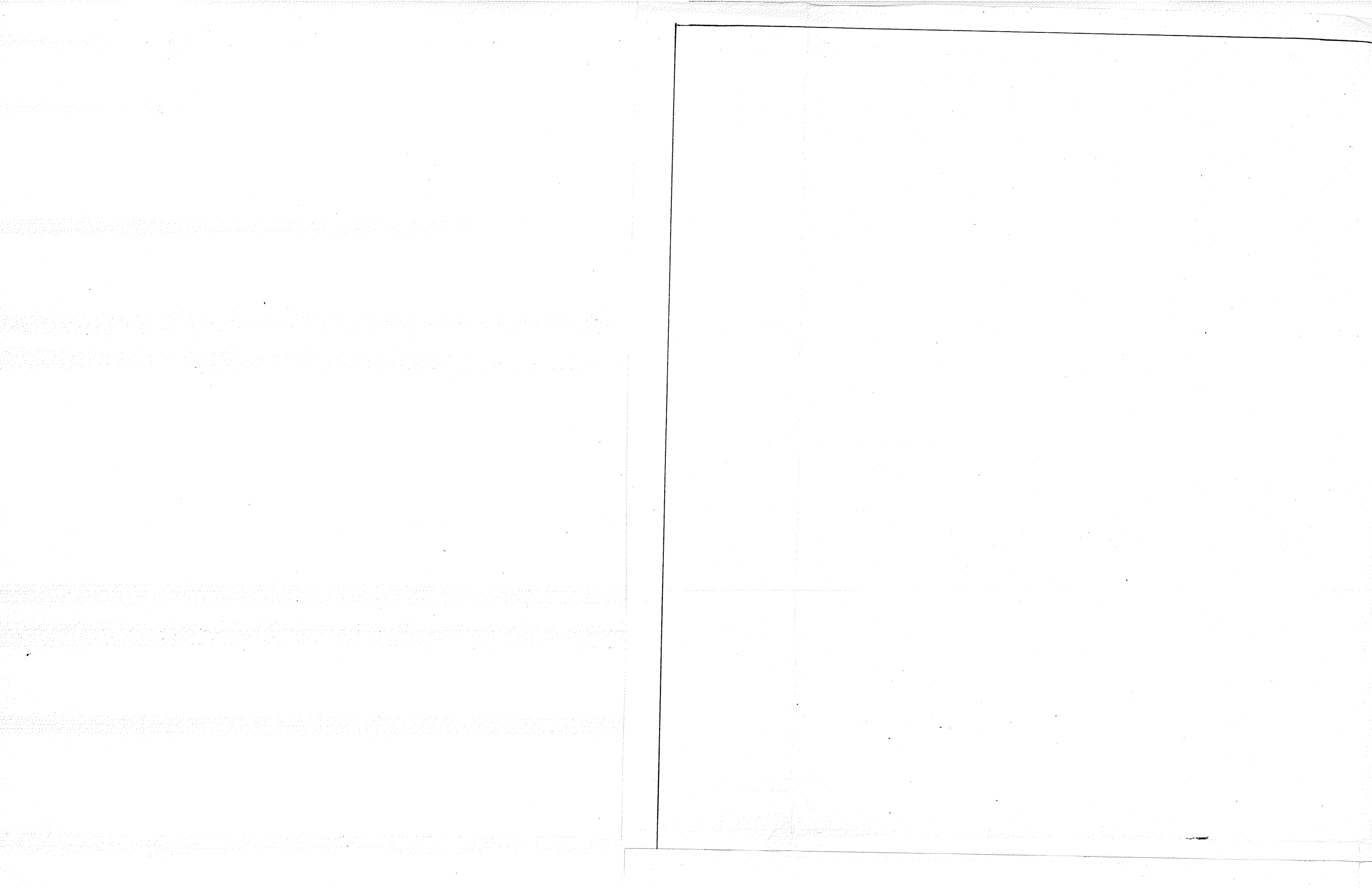
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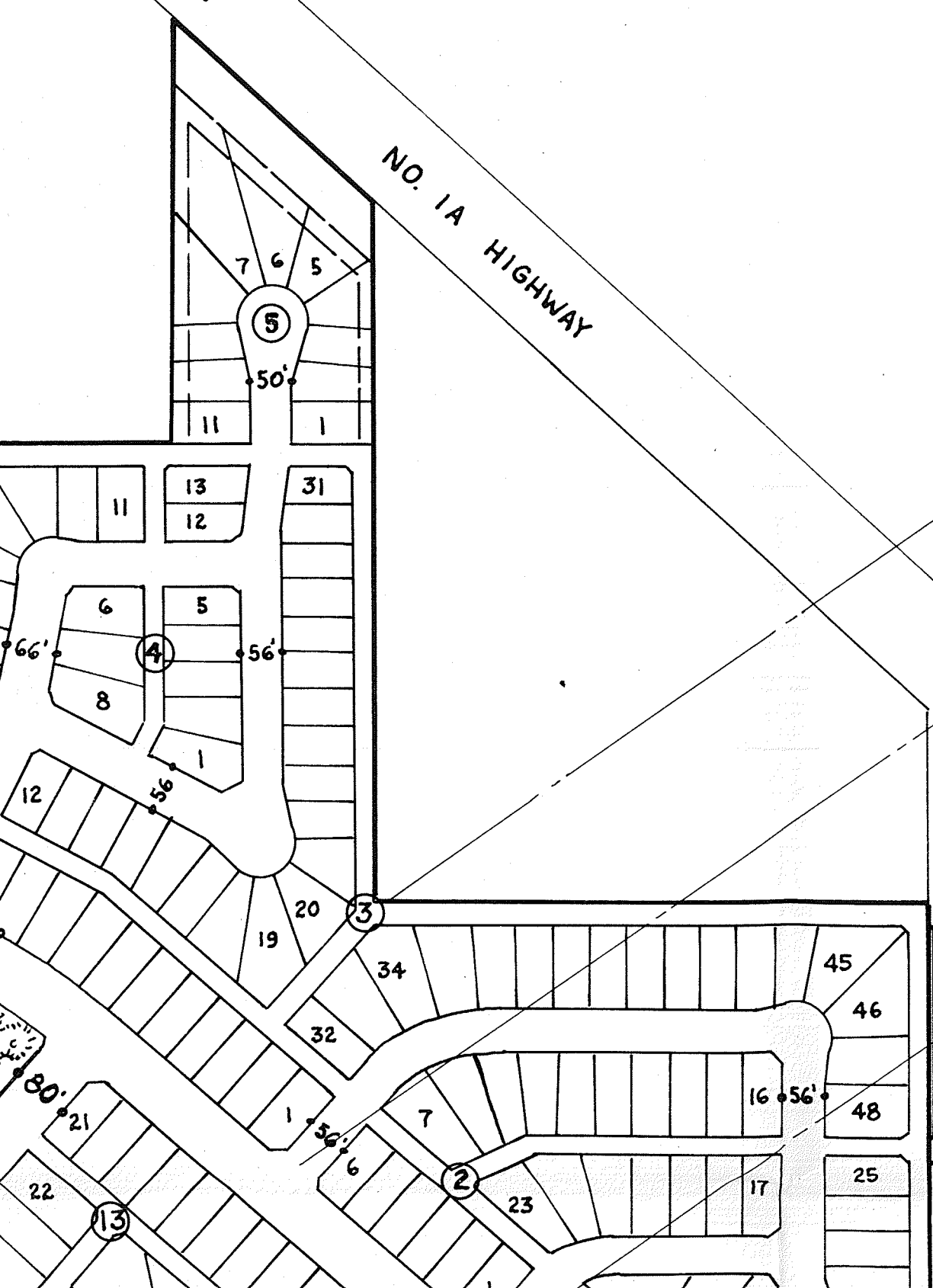




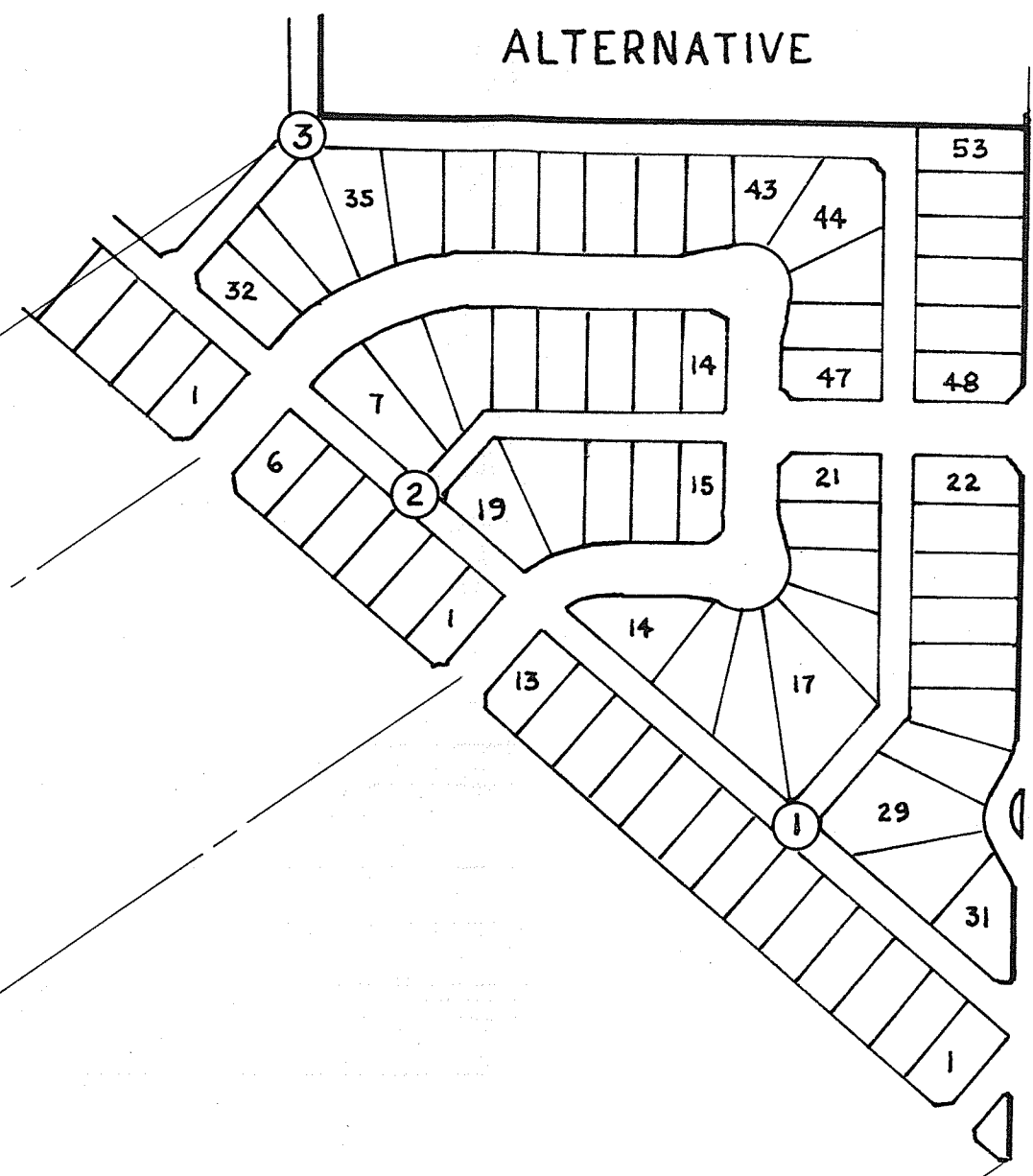


PLAN 3418 EZ

NO. 1A HIGHWAY



ALTERNATIVE



COMM.
RES.
91 Ac.

PLAN 3418EZ

NO. 1A HIGHWAY

PROPOSED WEST BY-PASS

BOULEVARD
COMMUNITY RESERVE
4.5 ACRES

COMMUNITY
RESERVE
0.94 ACRES

COMMUNITY CENTER
HALL

CLUB HOUSE

SCH.

SWIMMING

SKATING

C.R.
1.36
ACRES

SHOP

APTS.

APT.

S.S.

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P

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SOUTH BOUNDARY SE 1/4 SEC. 2

SOUTH BOUNDARY SW 1/4 SEC. 1

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5.0 ACRES

COMMUNITY
RESERVE

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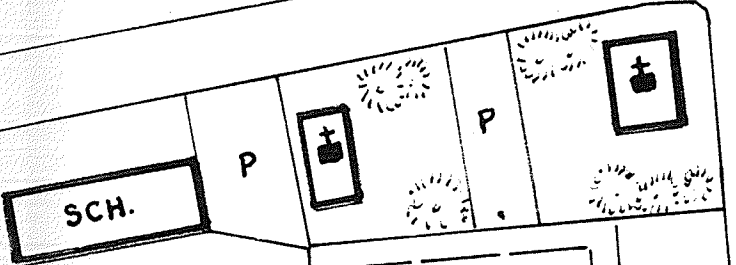
COMMUNITY
RESERVE
1.7 ACRES

66-FT POWER LINE EASEMENT

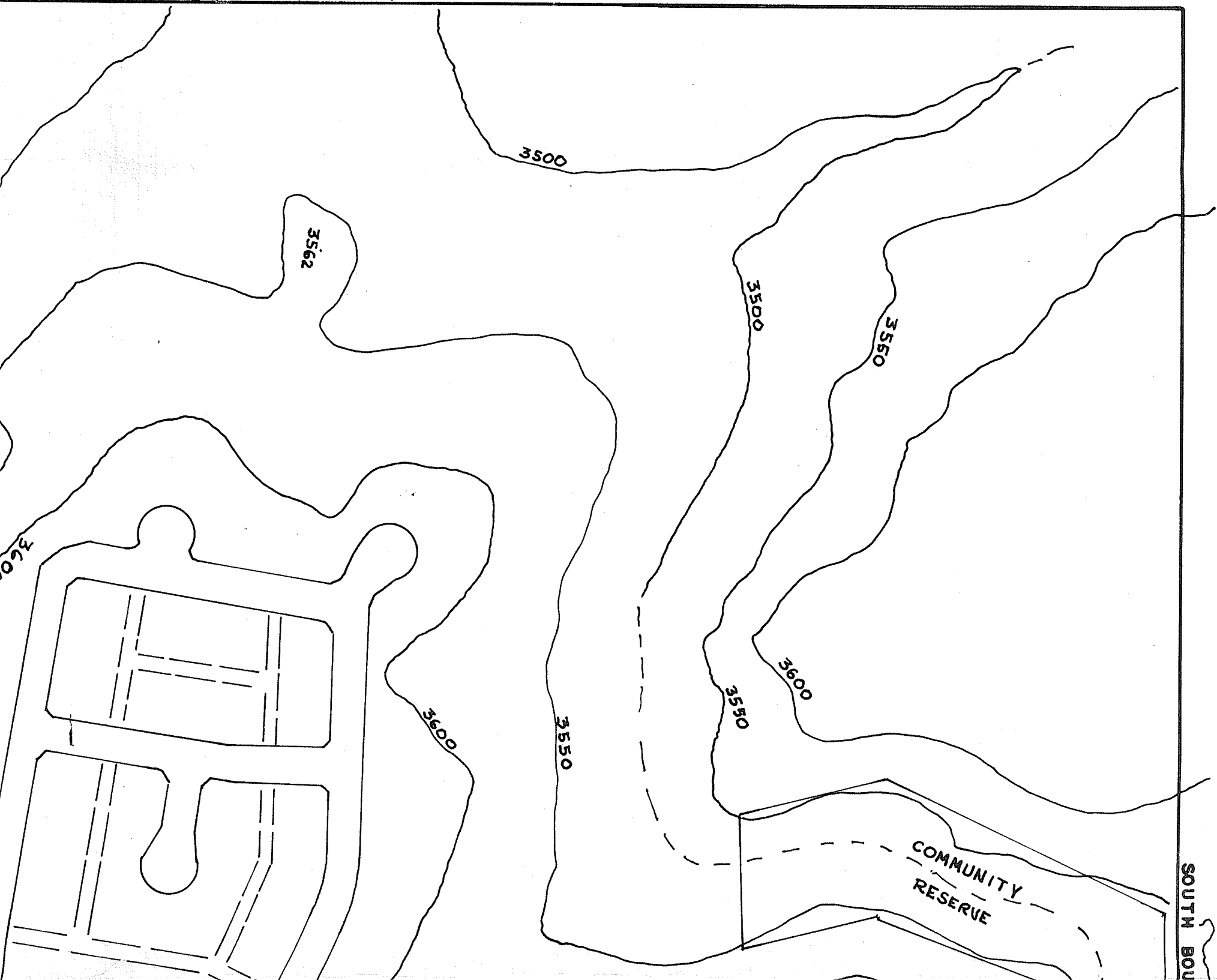
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COMM.
RES.
0.73 Ac.

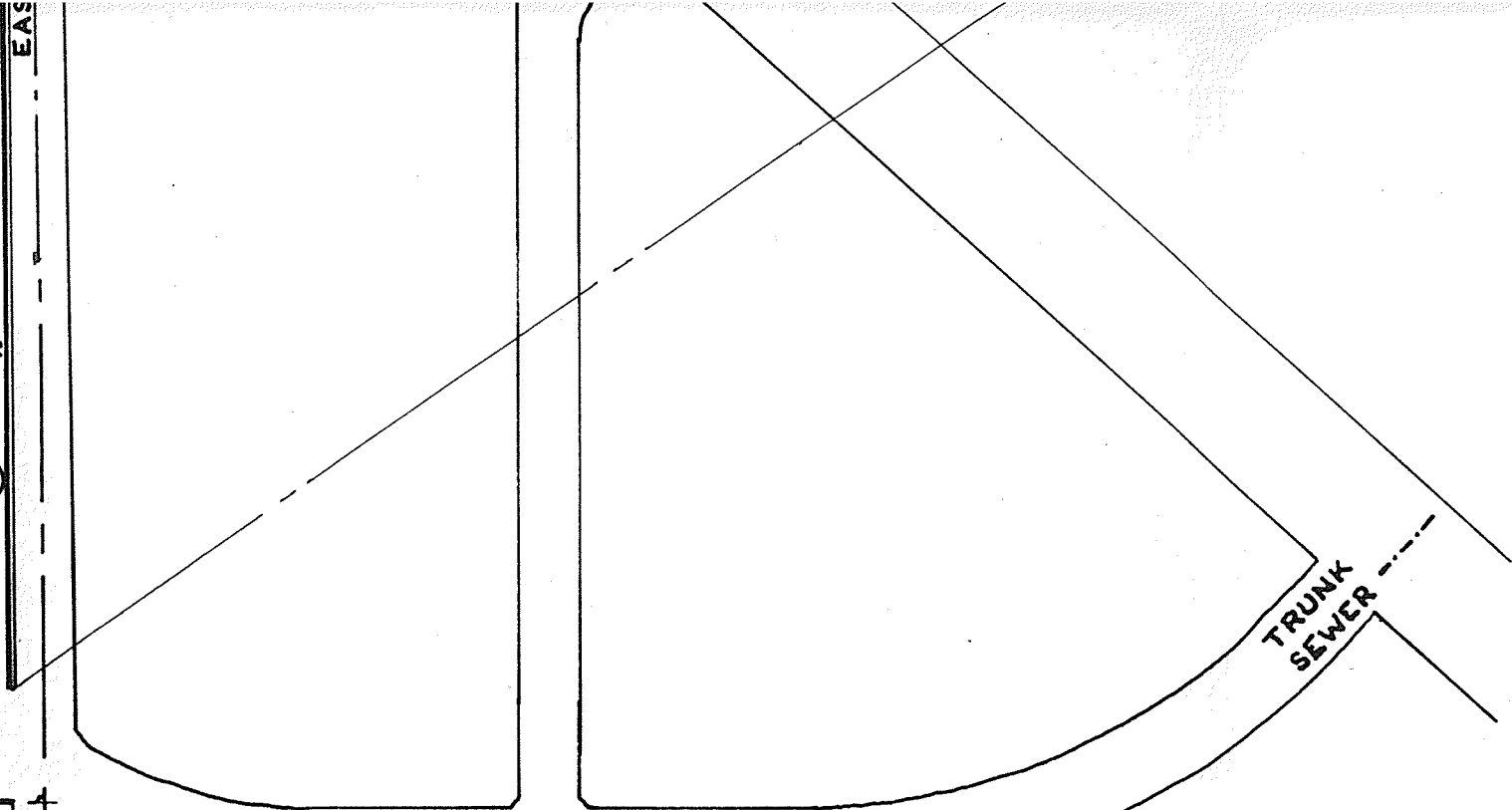
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WEST BOUNDARY NE 1/4 SEC. 35

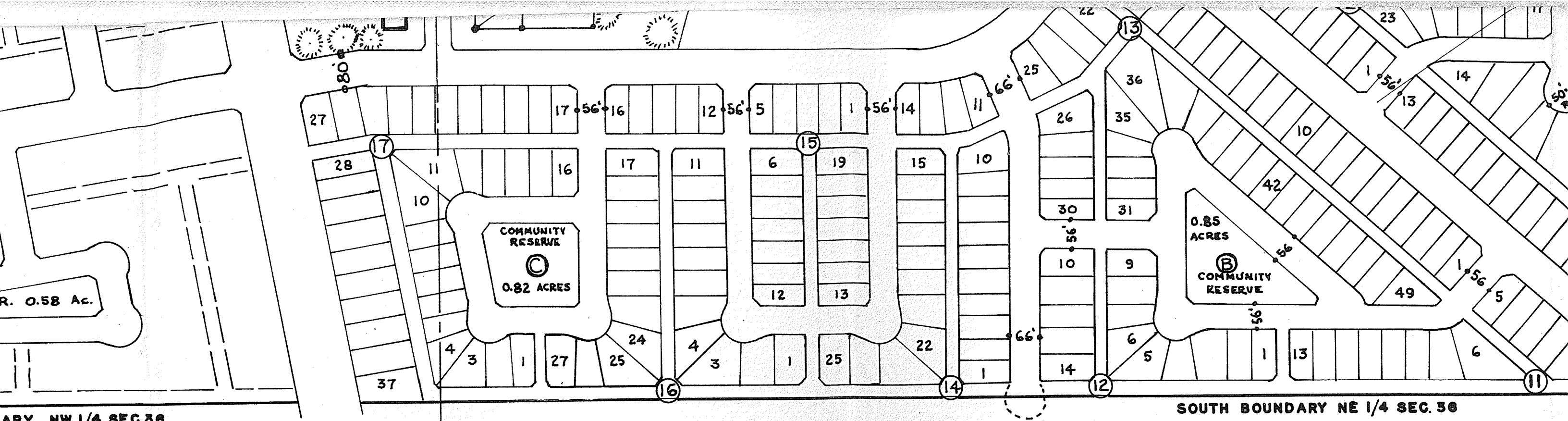


SOUTH BOUNDARY



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8			10		13

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26 1962

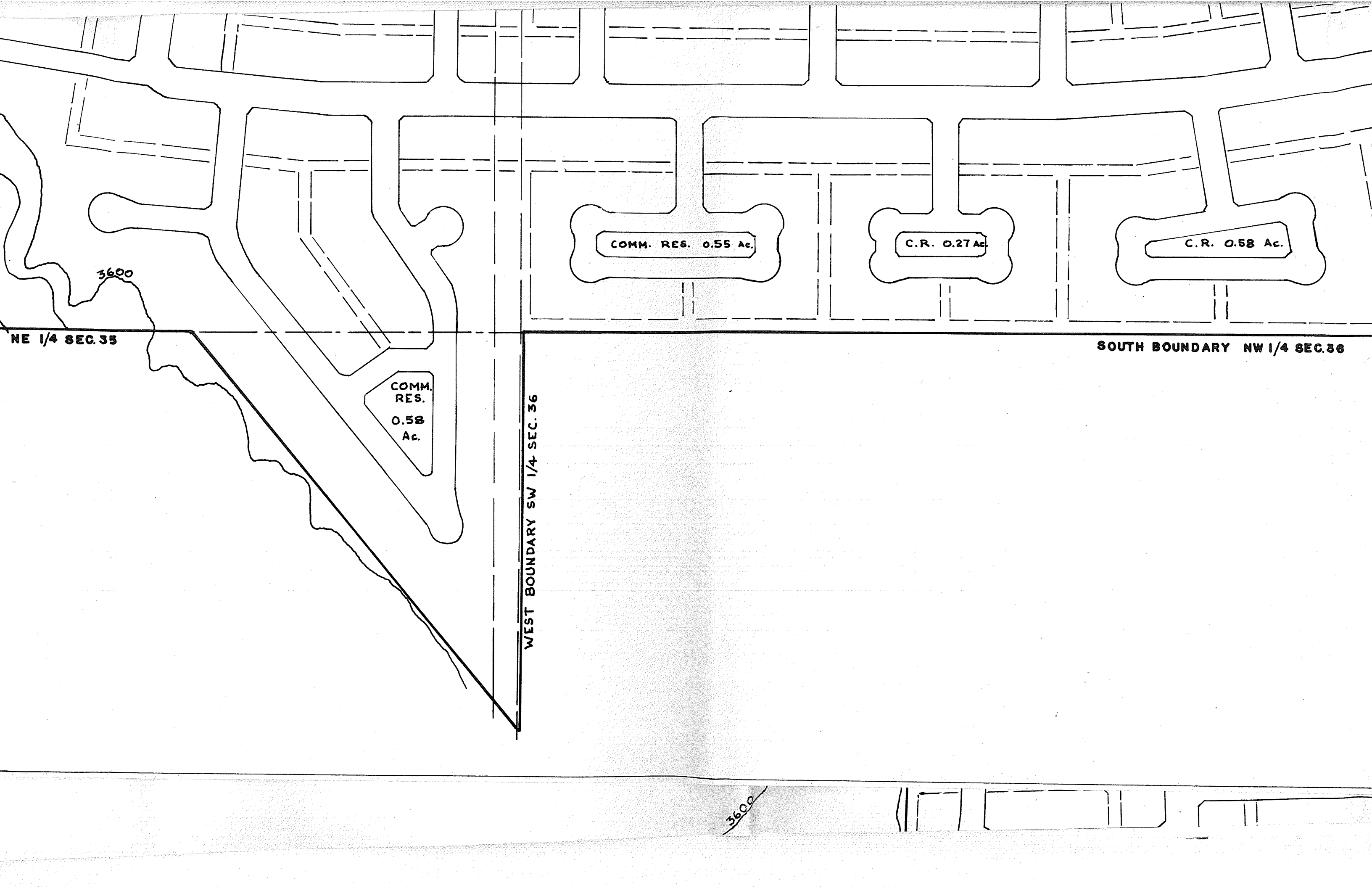


UNIVERSITY ACRES SUBDIVISION

SCALE : 1" : 200'

A. P. Stevens

FEB 26 1962



COMM. RES. 0.55 Ac.

C.R. 0.27 Ac.

C.R. 0.58 Ac.

COMM.
RES.
0.58
Ac.

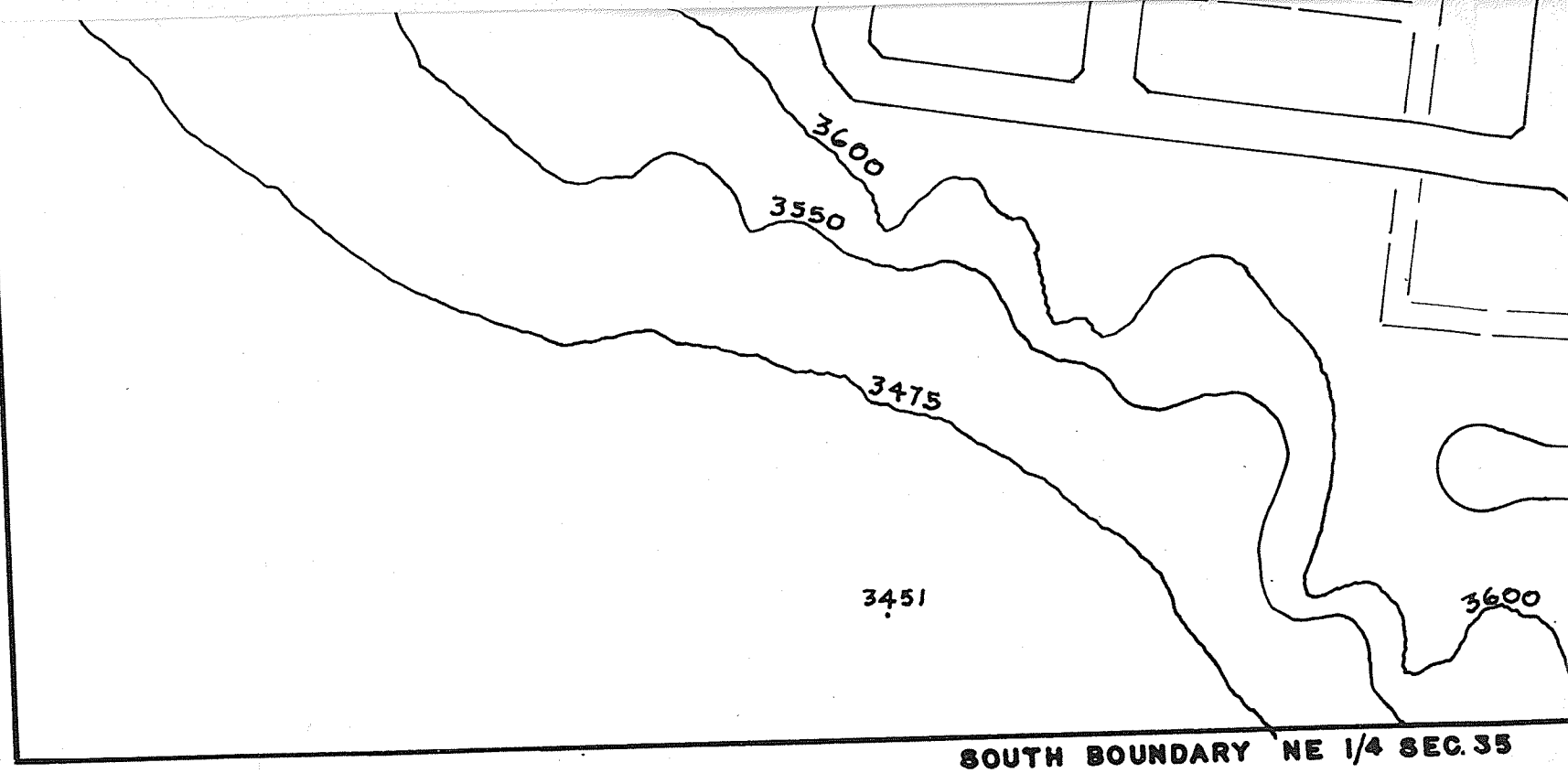
WEST BOUNDARY SW 1/4 SEC. 36

SOUTH BOUNDARY NW 1/4 SEC. 36

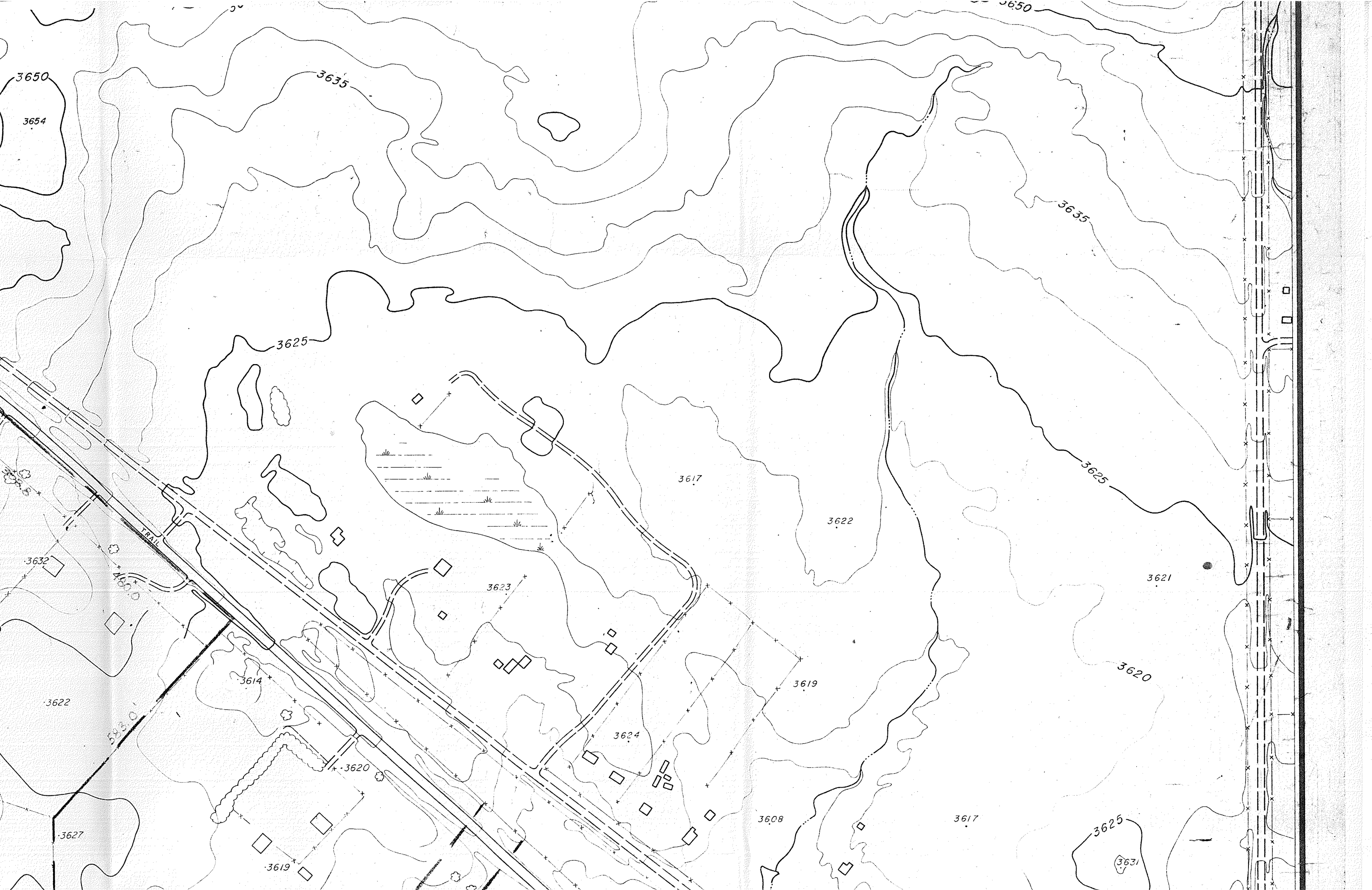
NE 1/4 SEC. 35

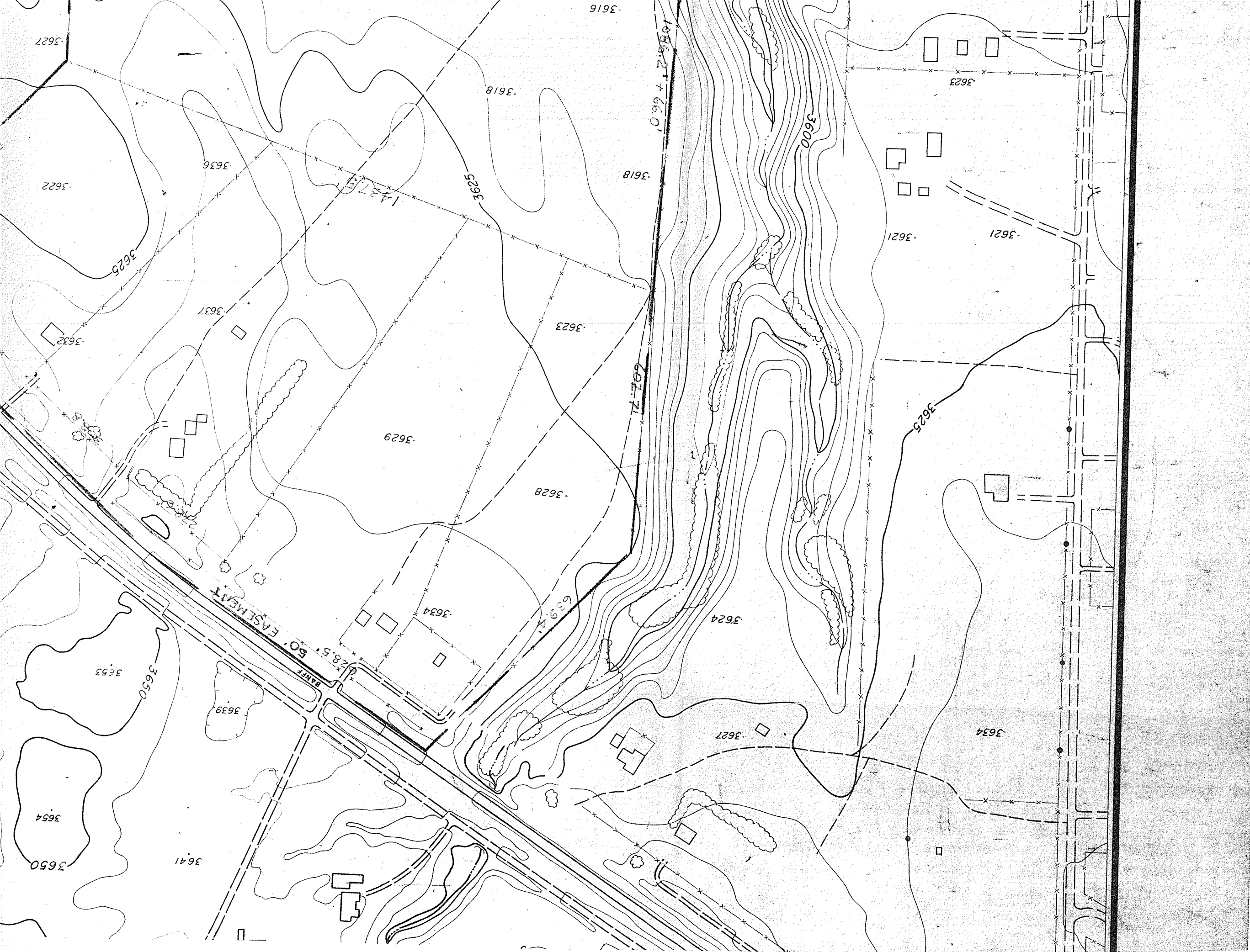
3600

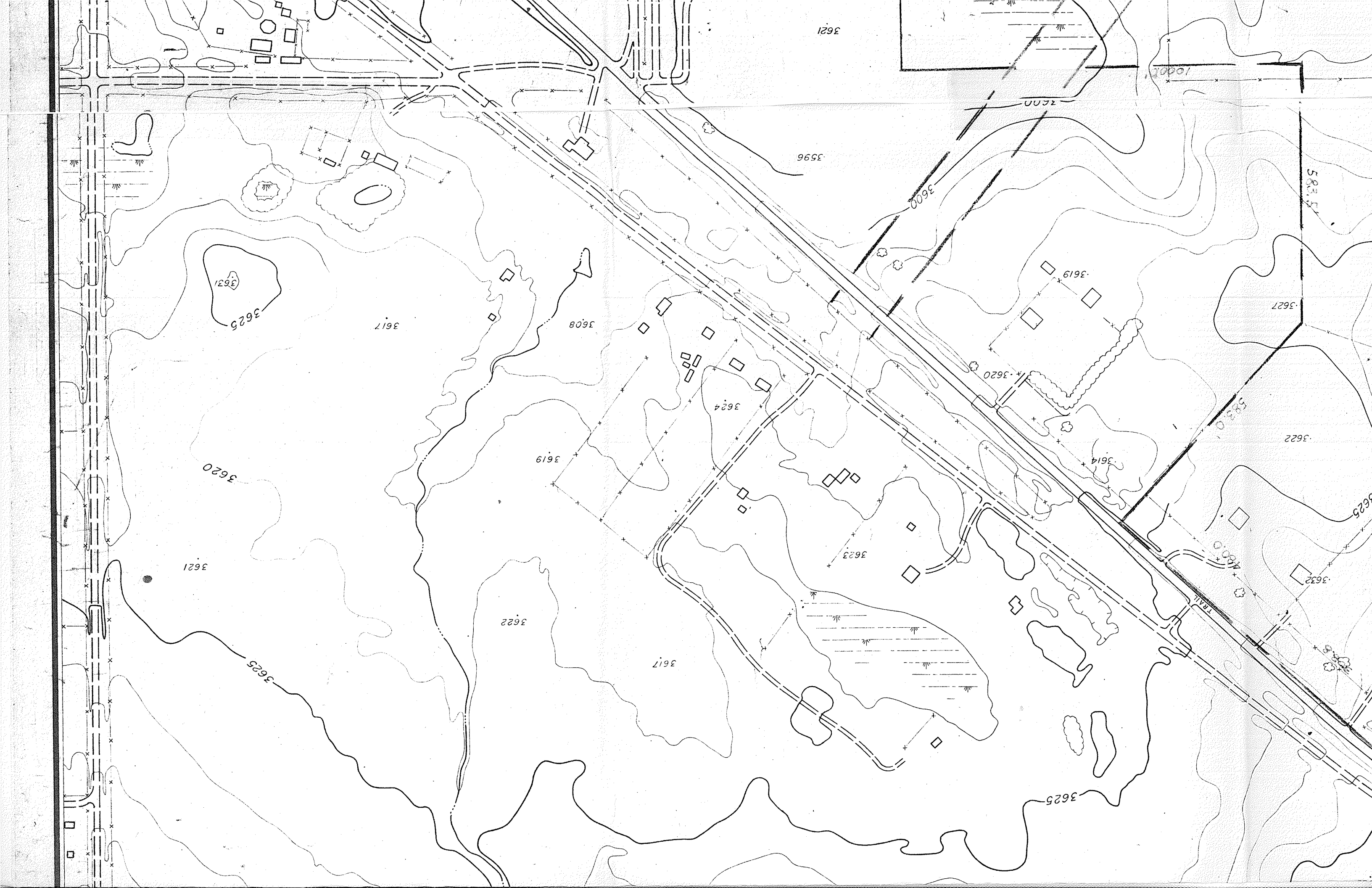
3600



SOUTH BOUNDARY NE 1/4 SEC. 35







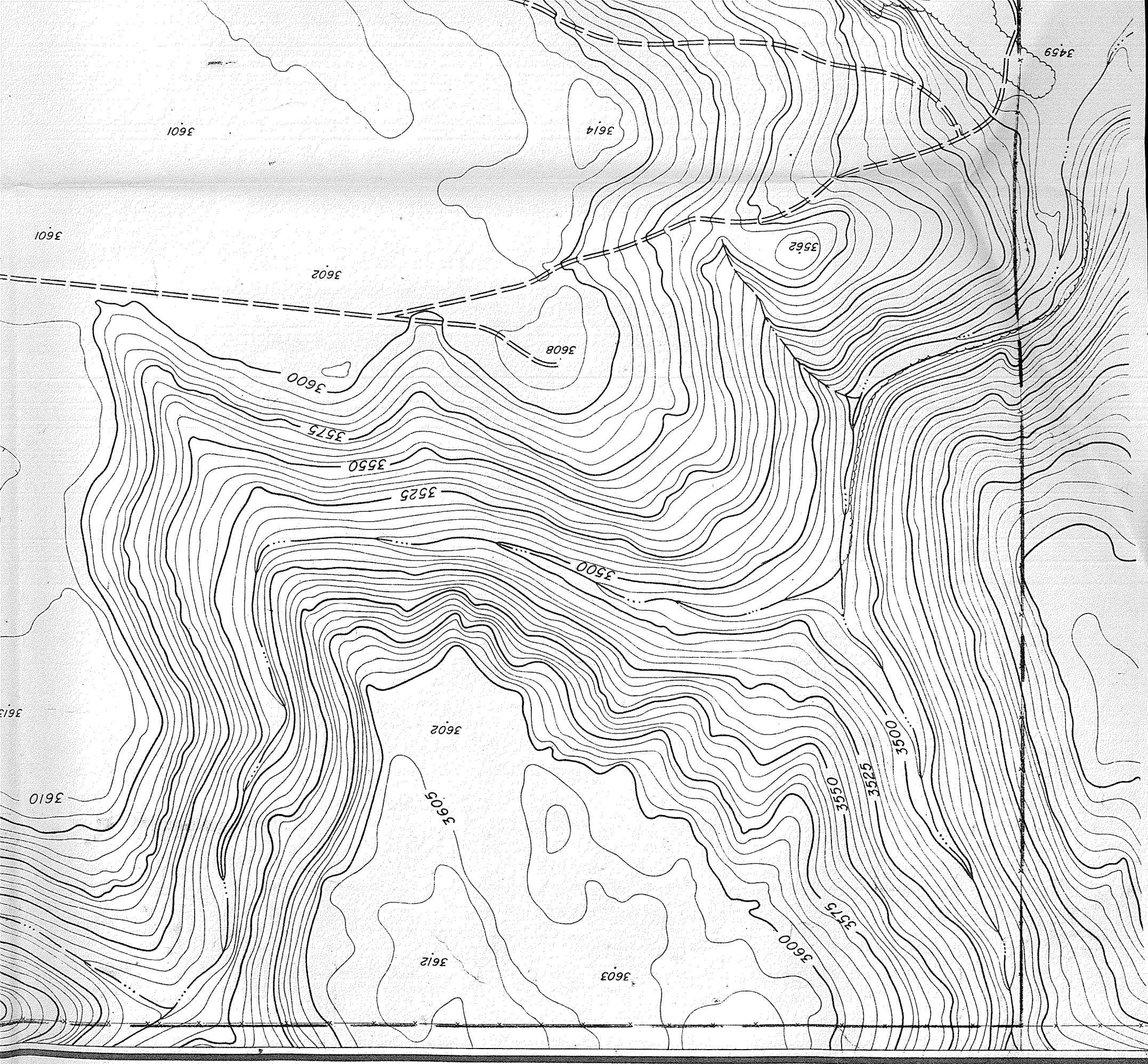


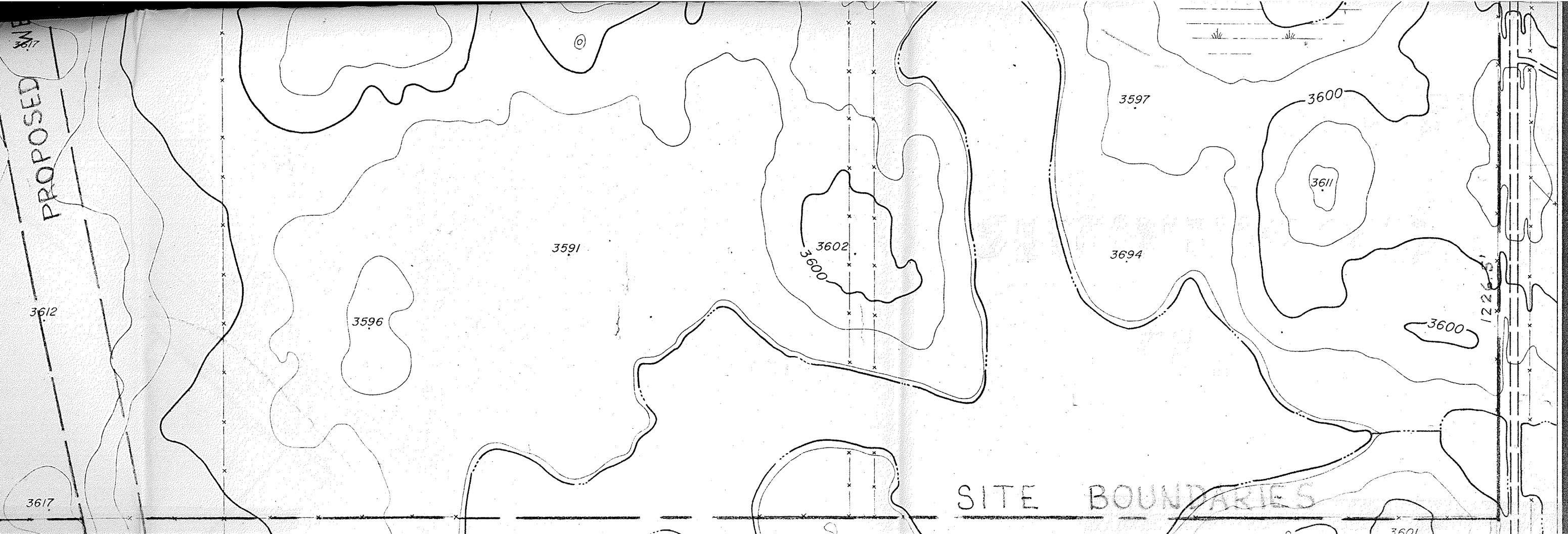


PROPOSED WEST BY-PASS

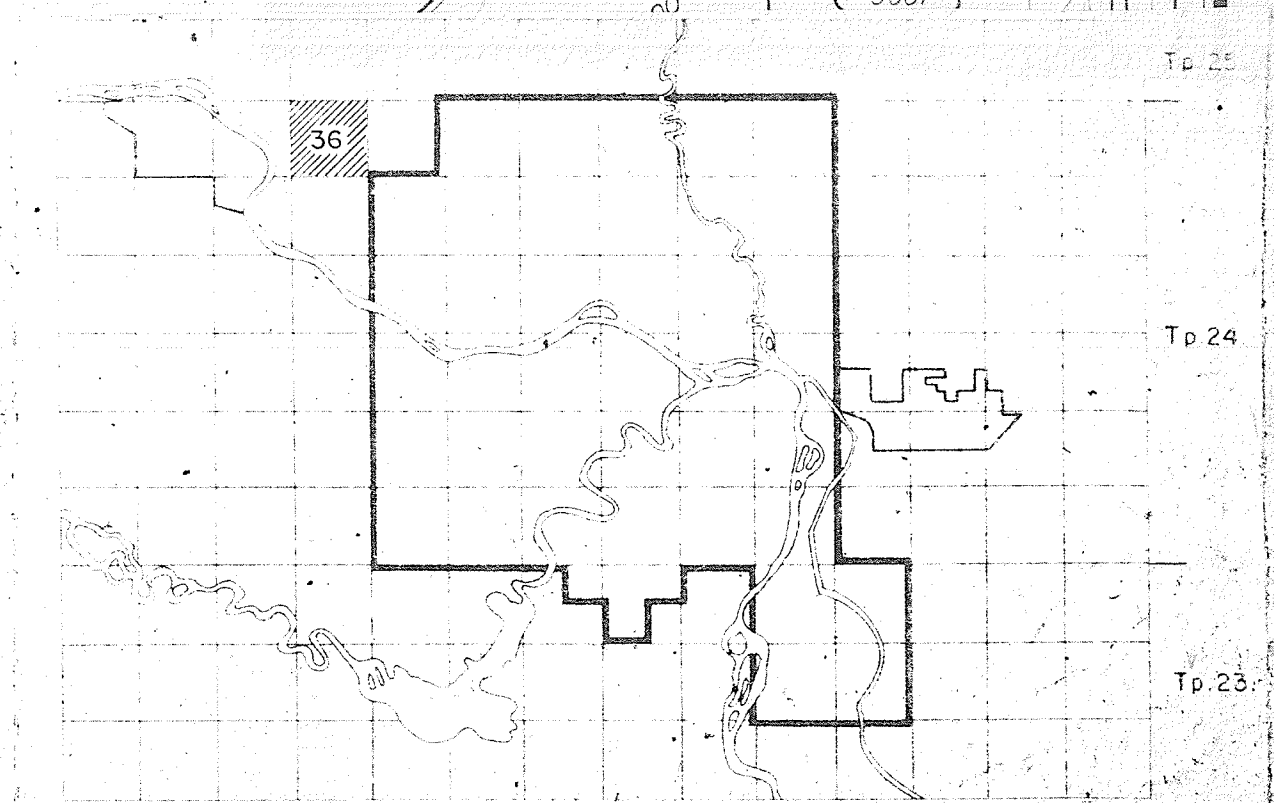
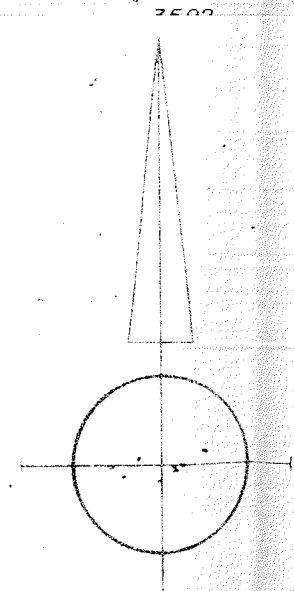
SECTION





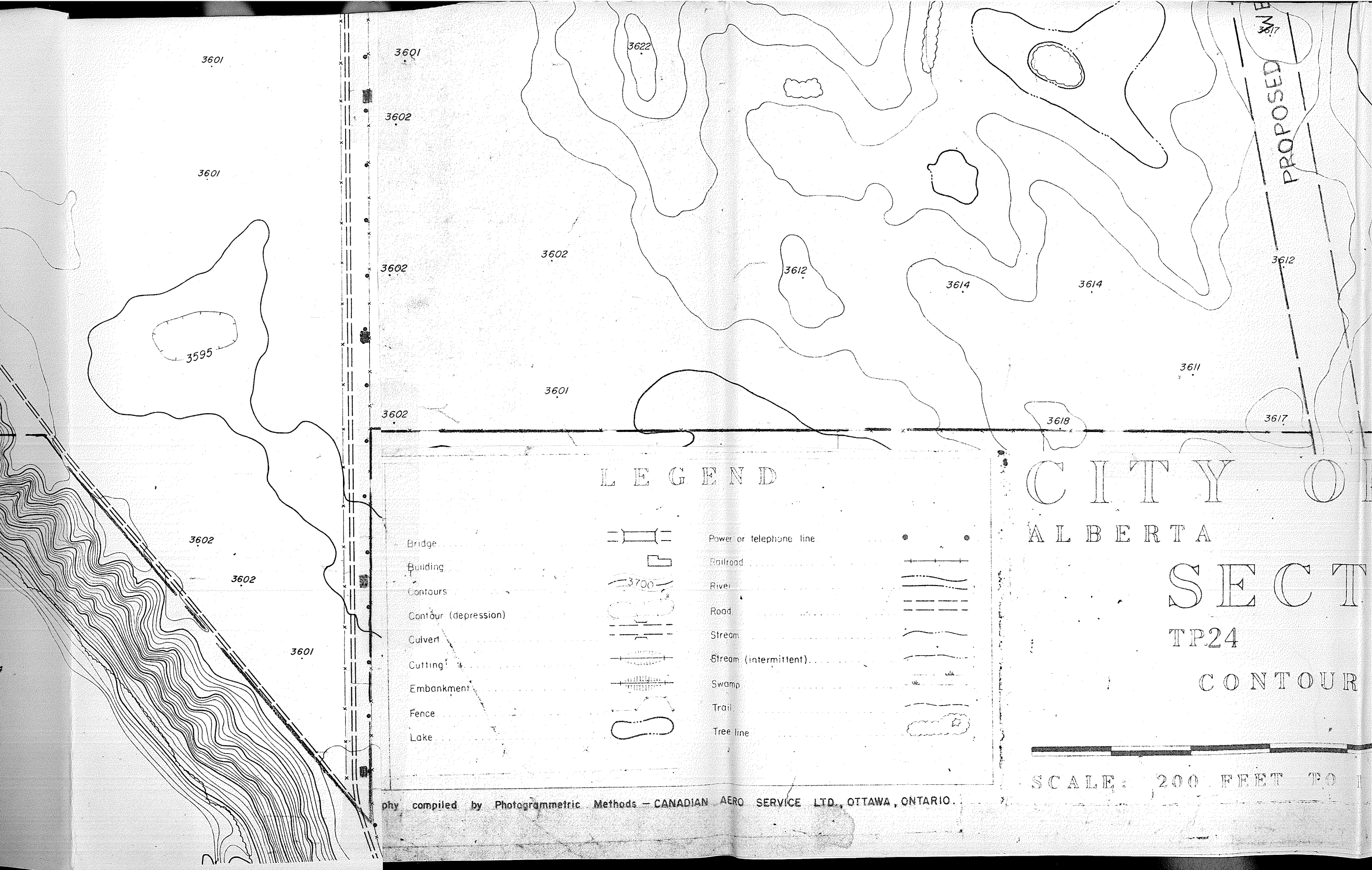


OF CALGARY
TOPOGRAPHIC SERIES
SECTION 36
RANGE 2 W. 5TH M.
CONTOUR INTERVAL 5 FEET



SHEET INDEX

AK - 36m - 36.23



3601

3601

3622

3602

3601

3602

3602

3612

3614

3614

3612

3611

3602

3618

3617

3595

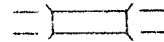
3602

3602

3601

LEGEND

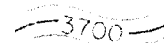
Bridge



Building



Contours



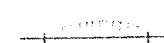
Contour (depression)



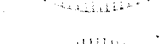
Culvert



Cutting



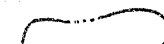
Embankment



Fence



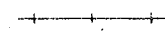
Lake



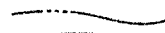
Power or telephone line



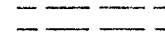
Railroad



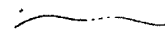
River



Road



Stream



Stream (intermittent)



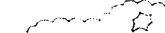
Swamp



Trail



Tree line



CITY OF

ALBERTA

SECTION

TP24

CONTOUR

SCALE: 200 FEET TO

phy compiled by Photogrammetric Methods - CANADIAN AERO SERVICE LTD., OTTAWA, ONTARIO.











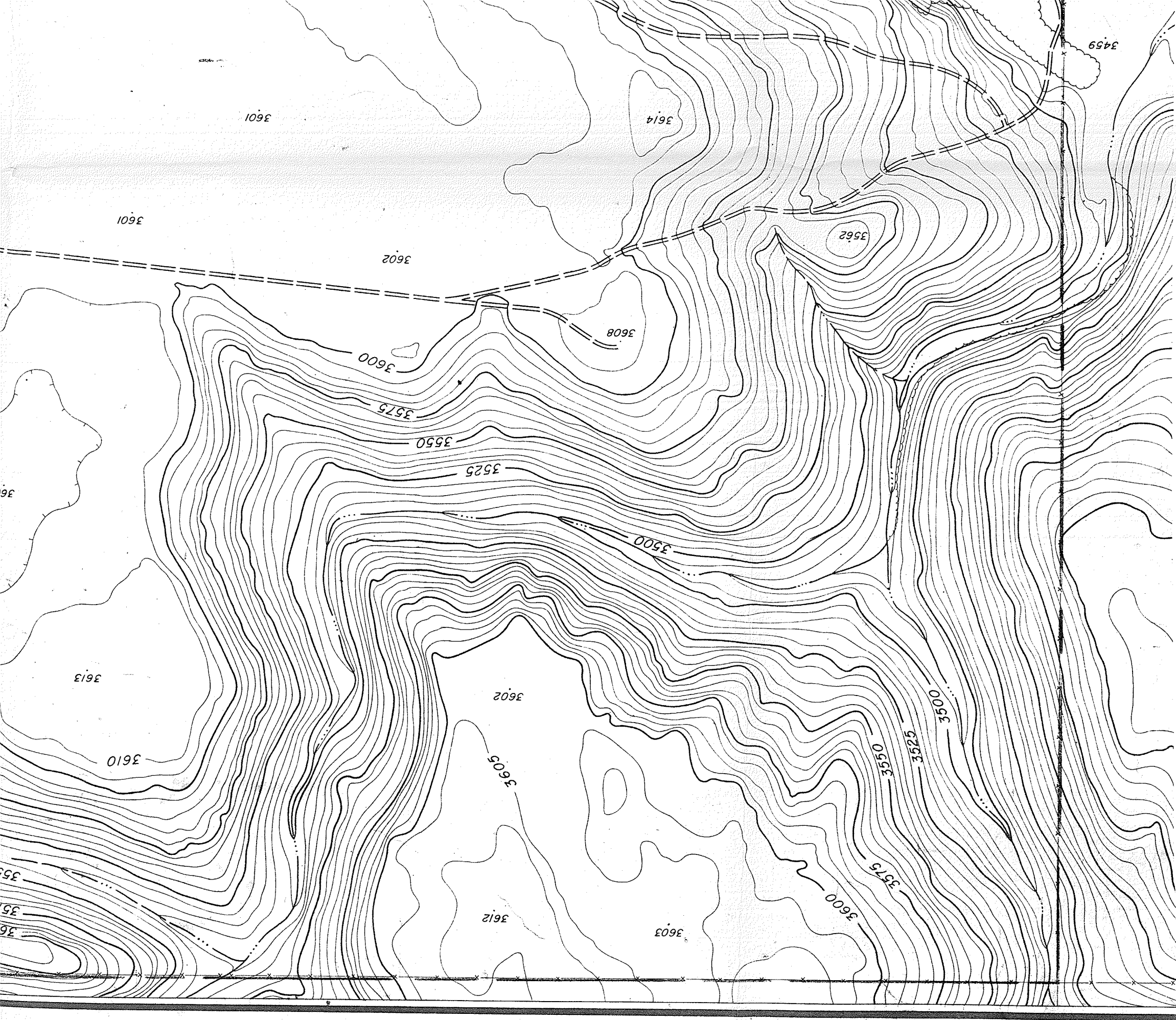
PROPOSED WEST BY-PASS

$D = 2\frac{1}{2}^\circ$

R.O.F.W. = 132.0°



[illegible]



PROPOSED

M 3617

3612

3617

3596

3591

3602
3600

3694

3597

3600

3611

3600

1226.5'

SITE BOUNDARIES

3601

TOPOGRAPHIC SERIES

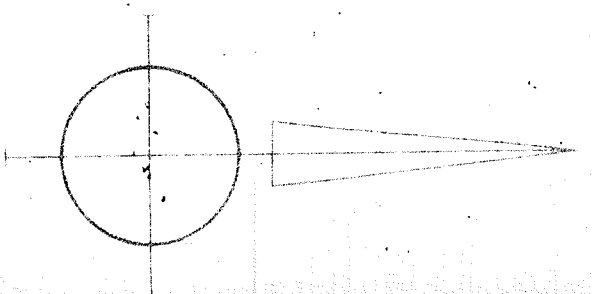
SECTION 36

SCALE: 2

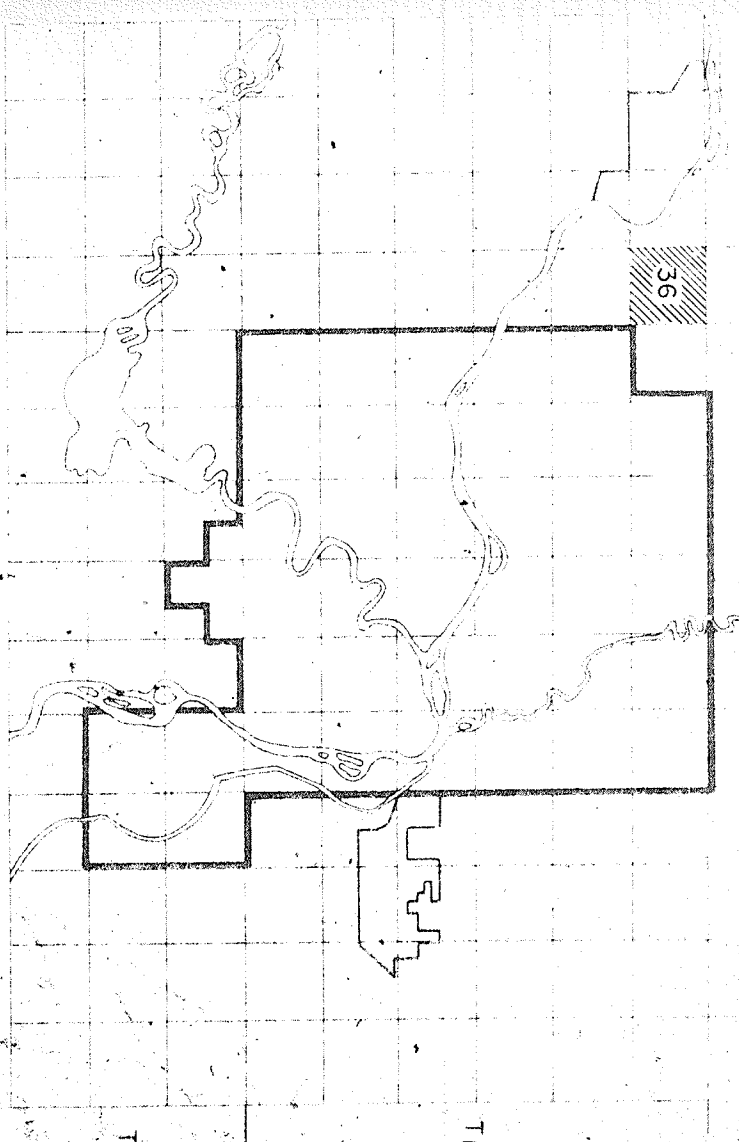
W. 5TH M.

SECTIONAL INTERVAL 5 FEET

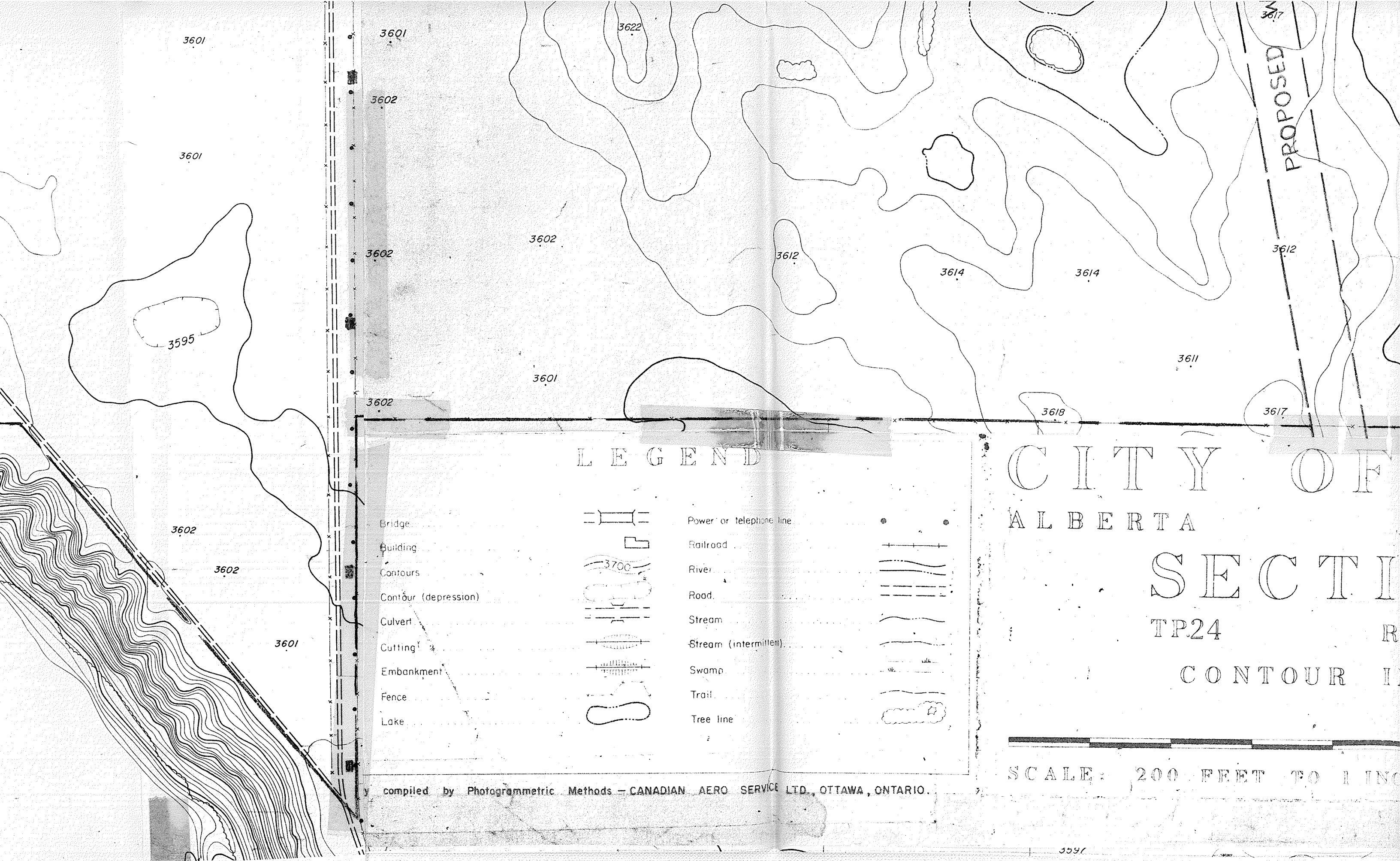
SECTIONAL INTERVAL 5 FEET



SHEET INDEX



AE - 36m - 36.23



3601

3601

3622

3617

3601

3602

3602

3612

3614

3614

3612

3595

3602

3601

3611

3602

3618

3617

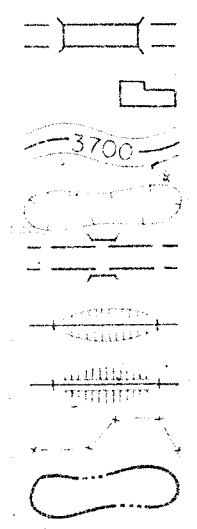
3602

3602

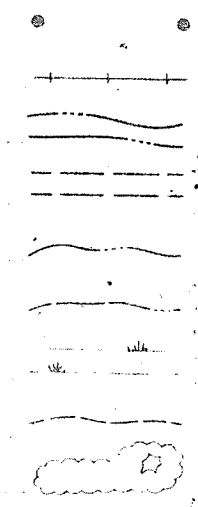
3601

LEGEND

Bridge
Building
Contours
Contour (depression)
Culvert
Cutting
Embankment
Fence
Lake



Power or telephone line
Railroad
River
Road
Stream
Stream (intermittent)
Swamp
Trail
Tree line



CITY OF ALBERTA

SECTION TP24

CONTOUR

SCALE: 200 FEET TO 1 INCH

compiled by Photogrammetric Methods - CANADIAN AERO SERVICE LTD., OTTAWA, ONTARIO.

3597

