

**JERSEY'S WATER:  
A NEW APPROACH**

**REPORT  
of the  
WATER INQUIRY BOARD  
to the  
PRESIDENT OF THE PUBLIC WORKS  
COMMITTEE  
STATES OF JERSEY**

## REPORT

## PREFACE

The States on 29th March, 1977 adopted a Proposition of the Public Works Committee that a Water Inquiry Board be set up as follows:-

Sir Giles Guthrie, Bart. (chairman)  
 Mr. H.M. de Ste Croix  
 Sir William Haley, K.C.M.G., LL.D., F.R.S.L.  
 Sir John Lewis, O.B.E., LL.D. (died 10th August, 1977)  
 Mr. O. Le Q. Mourant.

The Board's terms of reference were "to consider the water needs of the island of Jersey for the foreseeable future and to make recommendations to the Public Works Committee on how they can best be met." The Board now present their Report.

## MAIN RECOMMENDATIONS

- (a) All the island's water above and below ground to be brought under one control.
- (b) The States to set up a Water Authority to exercise this control.
- (c) The States to acquire a holding in the Jersey New Waterworks Company similar to that which it has in the Jersey Electricity Company.
- (d) The Water Authority to start forthwith on the metering of the whole island.
- (e) Metering to be accompanied by a pricing policy.
- (f) Boreholes to come under the Water Authority as outlined in the Report.
- (g) The Water Authority to initiate, supervise, and where necessary undertake research.
- (h) The use of part of St. Ouen's Bay as a storage aquafer to be foremost in its research programme.
- (i) The desalination plant to keep the reservoirs topped up each year from the beginning of May to the end of September.
- (j) Water saving devices to be introduced into new buildings of all kinds, and encouraged in old ones.
- (k) The Water Authority to undertake a sustained campaign to educate the public in the needs and advantages of not wasting water.

A full list of the recommendations is given at the end of the Report (p 11).

date of Report's signing.  
 20th September, 1977.

1. The 1976 drought, the controversy aroused by the Jersey New Waterworks Company's proposal to obtain additional water storage by flooding Queen's Valley, and subsequent debates in the States led to a Water Inquiry Board being set up to make recommendations about the island's future water resources generally.

2. Almost to the end of its hearings and deliberations the Board of five sat together. Only four can sign the Report. On 10th August, 1977 Sir John Lewis died suddenly. He was a man of fine character, wide experience and mature judgment. We mourn a splendid colleague.

3. The Board first came together on April 1st. They met twice weekly, to take evidence from all who wished to give any and to evaluate and discuss the mass of documentation and correspondence they received throughout the hearings. Public meetings were held in the Town Hall on August 15th, 17th and 19th.

## DEMANDS AND NEEDS

4. The Jersey New Waterworks Company's proposal to flood Queen's Valley being the main cause of the Inquiry, the Company was, on 25th April, the first to be heard. There were later meetings with its representatives, and all its reservoirs and installations were inspected. Its case will be examined in some detail later. At this stage it can be stated briefly. The Company has done so in its booklet *Water in Jersey*.

5. It is that the increase in the demands for water will be at the same rate in future as it has been in the past. The graph (*Appendix I*) shows the 1975 demand being doubled in the next twenty-five years. This assumption is the crux of the whole matter. It is ultimately a self-defeating policy. The point would eventually be reached where the island had no additional supplies or storage capacity left. The acceptance of uncontrolled continuous growth of demand

for water has been discarded elsewhere. In the United States, in France, in Holland, in Belgium and in other countries the main emphasis is now on conservation, on controlling demand rather than on increasing supplies. We are convinced that this must be Jersey's policy also.

6. Throughout our discussions with the Jersey New Waterworks Company's representatives their arguments showed them to be oblivious of the real problem. Their vision was disturbingly narrow. Queen's Valley must be flooded immediately, and then another valley, until, on their own submission, there would be nothing left but increased desalination and the use of treated effluent. We read and listened to the conflicting views of highly technical experts on how demands could be met. Increasingly we became convinced of the need for a wider view and for laymen's commonsense.

7. We would emphasise that none of us is in favour of change for the sake of change. Indeed the best Report, where it is justified, is one of three words: "Leave well alone." But the further we went into the future of Jersey's water, the more clearly we saw that all was not well.

8. We do not say that there will be no growth in demand. Increase in population, additional housing, new domestic and industrial appliances using water, will ensure that there is. But demands are different from needs. The States has already shown its concern that the island's resources in many vital directions will eventually be exhausted if limits are not imposed. It is now generally accepted that around 80,000 should be the maximum population. Nothing can make Jersey other than an island a little over eight miles by five. Already some demands are outstripping the public interest.

9. A straight-line graph inexorably moving upwards of the use of almost any commodity ultimately becomes socially and economically unacceptable. With no commodity is this more true than with water. Unmodified extension of past experience as a measure of expectations in years to come has been aptly described as "entering the future backwards".

10. Subtract needs from demands and the difference is largely waste. Waste of water is not a mark of civilization or of the standard of living. It is profligate and expensive. Representations were made to us that Jersey is more wasteful in its use of water than other countries are. The bases for figures of water consumption vary so much from one country to another that it is hazardous to try to make statistical comparisons. It has been estimated that Jersey's water consumption equals nearly 49 gallons per head per day of the resident population. There is little reason to doubt that this could be reduced to, say, 36 gallons a day without hardship.

11. That water is wasted is manifest. To adapt a famous Motion on the Crown passed by the House of Commons in 1780, "The waste of water has increased, is increasing, and ought to be diminished." We hope to show that there can be discipline without detriment.

#### CONTROL

12. The Environmentalists - as the main body of opponents to the flooding of Queen's Valley named themselves - were forced to consider waste. They pointed out that many Governments are now acutely conscious of the fact that not a single one of Nature's bounties is inexhaustible. They made many suggestions for the more economical use of the island's water. They advocated metering and water saving devices. They urged the case for water management generally. They did so "to save Queen's Valley." They had been the "Save our Valleys" campaigners. Their aim stopped them short of seeing the whole problem or even its major component. Their arguments were impressive as far as they went. Our terms of reference required us to go farther.

13. All we have heard and read has convinced us of the urgent need for the people of Jersey to make a completely new approach to their use of water. There should be a new policy. It should be on a new scale. The operations of the Jersey New Waterworks Company are important. They cannot be treated in isolation. It is essential that Jersey's water resources and their consumption be dealt with as one whole. Unless this is done the water needs of the island as a whole cannot be adequately safeguarded.

14. The Jersey New Waterworks Company is in an ambiguous position. A commercial company, it indignantly refutes any charge that its profits depend on the amount of water used. This is true where payment is made on the parish rating basis. But a little over 33% of the water it sells is metered. Over this part of its operations more water flowing out does mean more money flowing in. A further complication is that the Company's coverage of the island is limited. How far and how fast it will grow cannot be foreseen. To some extent this will be affected by whatever may be the States' decisions about our recommendations. The one certainty is that the Company's coverage of the island will never be anywhere near complete.

15. Jersey's other sources of water are therefore of great importance. Boreholes, wells, springs and streams make an appreciable contribution to the island's water supplies. Moreover, supplies drawn from above and below ground need to be regarded as indivisible. The underground network of water tables may not be all connected from any short-term point of view. On a longer and more recondite basis each part contributes to the whole. Above-ground storage and usage is also affected by it. We have come to the inescapable conclusion that the Jersey people as a whole should own the whole of Jersey's water above and below ground and that it should be legally brought under one control.

#### A WATER AUTHORITY

16. We recommend that a Water Authority be set up to exercise this control. It should be given legally enforceable powers. A new and more real Jersey Water Law is needed. The Water (Jersey) Law, 1972 is in effect a Jersey New Waterworks Company Law. The new Law should give the Water Authority ultimate control of all sources of water. We emphasise the word "ultimate". We explain later in the Report how we think the Water Authority should operate.

17. A case can be made out for the Water Authority to be the Public Works Committee or the Resources Recovery Board. Some of its duties might seem to come within the Public Works Committee's ambit, whilst the Resources Recovery Board is already responsible for the management of storm water and sewage effluent. We are strongly of the opinion, however, that the Water Authority's responsibilities as we outline them later, and the work it will need to put in hand, demand that it should be a body in its own right. Water is now being given special importance in ever-widening areas of the globe. We appreciate that there may be fears of an increase in Jersey's bureaucracy. We do not believe that the staff of the Water Authority need be large. We do believe its members must be able to bring single minds to the problems they will have to solve.

18. We hope that no one will regard the setting up of such a Water Authority as a step towards socialism. Many capitalist countries have found the need to bring services and supplies vital to their communities under one control. We believe that if the work of such a Water Authority were to be reviewed some years hence, its costs, social and financial, would be seen to have been far exceeded by its gains.

19. The Water Authority's control of the Jersey New Waterworks Company will be necessary as part of the States' general water strategy. As we have said, different sources of water cannot be neatly compartmented. In addition to the practical reasons for subordination, there are also psychological reasons. We were unfavourably impressed by the Jersey New Waterworks Company and its consultants and advisers in the way they commented upon the many helpful and practical suggestions put forward by individuals. Their comments were often hostile and impatient.

20. We recommend that the States take a holding in the Jersey New Waterworks Company similar to that which it has in the Jersey Electricity Company. The chairman of the reorganised company should be appointed by the States. A young, active man will be needed. One of the new Board's first requirements will be to consider the Company's financial structure. There is a clear need for a better gearing between the ordinary shareholding and the loan capital. Whatever new capital expenditure is undertaken will call for a reconsideration of the loans position as a whole. Provision for depreciation should also be reviewed.

21. We do not see the Water Authority as interfering in these matters. The Jersey New Waterworks Company would continue to run its business technically and administratively. The Water Authority's control would be of major policy, which it would need to ensure did not conflict with its general aims as approved by the States.

22. Ultimate control of these resources will not, however, be enough. Other prime duties of the Water Authority will be to promote research, to educate the public in the proper use of water and the avoidance of waste, and to publish ten year moving forecasts so that the States and through them the community, will have a recurring awareness of progress. The Water Authority should be the active guardian of every inhabitant's interest in water.

#### METERING AND PRICING POLICY

23. The Water Authority's first aim will need to be the conserving of the island's present water supplies. Whatever new measures of storage and supply are decided, they will take time to implement. The quickest and most effective way to start remedial measures is metering. We have listened to the arguments for and against metering. No measure has been more frequently advocated by witnesses we have heard and in proposals we have received. Different countries' experiences with metering have been put before us. Estimates of some European reductions in consumption vary from 10% to 40%. American figures show wider ranges.

24. We believe that the merits of metering as public policy in Jersey are overwhelming. Domestic water consumption between 1961 and 1976 is estimated to have risen by 103% against a 35% increase in the population in private dwellings served by the Jersey New Waterworks Company. The public needs to be made conscious of what is happening and their own part in it. The main objectors to metering who have appeared before us have been the representatives of the Jersey New Waterworks Company. Their doubts have been invalidated elsewhere and their practical objections overcome elsewhere.

25. Metering of the whole island should start at once. A limited experiment for a trial period would serve no useful purpose, its artificiality would preclude real results. It would waste time and lead only to inconclusive arguments. The States, through the Water Authority, should pay for the meters and for their installation, the costs being written off as they occur. Installation should be by an independent company, not by the Jersey New Waterworks Company. Exaggerated estimates of costs have been made to us. We think the cost would be under £1 million. Fears of meter-reading being expensive can be met by water, gas and electricity meters being read simultaneously by one man. This is done elsewhere, in some cases only once a year, the reading being used to correct quarterly assessments.

26. Metering without a pricing policy would not be fully effective. We have been struck by the reversal of thinking about water consumption that has taken place in some parts of France and the United States. No longer does the big consumer pay less for his water. Now, the more he uses, the higher goes his rate. This policy is effective in the middle and upper ranges of the scale. At the lower end steps must be taken to protect the indigent. There are a number of ways of doing this. It would be for the Water Authority to find the best.

27. Hotels, guest houses, breweries, photographic firms, laundries, car-washing garages and all other activities benefiting from tourism should pay a higher rate during the holiday months, which also cover the period when the desalination plant is in use. When they appeared before us, the representatives of the hotel and guest house section said they would not be opposed to higher seasonal charges provided other commercial users who benefit from tourism would be treated in the same way. The Water Authority would need to be flexible from year to year according to circumstances.

#### BOREHOLES AND WELLS

28. Boreholes cannot be ignored. They are a practical and political problem. Our function is practical. We can only recommend what in our view best serves the island's interests. Political considerations are a matter for the States.

29. Boreholes may become an increasingly important factor. Their use would be extended by a metering policy that excluded them. Therefore we recommend:-

- (a) that all existing boreholes, wells and stream extraction points in the island should be registered and that no new borehole may be sunk without the permission of the Water Authority;
- (b) that from the date of this Report whatever steps are possible should be taken to ensure that no new boreholes should be sunk until the States has legislated;
- (c) that every borehole should be metered;
- (d) that consideration should be given to the question of payments to the Water Authority by all commercial users of boreholes, according to their meter reading, and that a higher rate could be charged during the holiday months to those who benefit from tourism;
- (e) that the policy regarding domestic users, and farmers should be a matter for the Water Authority under the States.

30. It may be asked why metering is necessary if no charge is made. The amount of water extracted from boreholes is large, farmers and others drawing an estimated 300 million gallons from them yearly. Whether the water metered is paid for or not, it is necessary for the Water Authority to have continuing information about the drawings from boreholes to add to other factors guiding their policy.

31. In addition, we recommend that an examination of all wells, including those sealed up, should be made. Sealed wells should not be re-opened without the permission of the Water Authority. One of the most important records of wells and boreholes in Jersey was made by the German geologist, Dr. Klüpfel, during the Occupation.

32. We appreciate that there will be some fears of metering. Special cases will be cited to show that it would be inequitable. There is plenty of unfairness in the present charging system for domestic usage. It will be easier to cope with those that arise through metering.

33. Metering, it is said, will increase costs. Present charges will have to rise considerably if waste remains uncurbed. It has been authoritatively estimated to us that the cost of a Queen's Valley reservoir could raise the price of water by 50% or possibly more. Metering puts expenditure on water at least partially under the consumer's control. It is a means of helping people to help themselves. Cost effectiveness had striking proof in 1975 when the consumption of water went down following a sharp rise in electricity charges, making heated water dearer. Metering should not be seen as an end in itself, but as playing a crucial part in the island's new appraisal of the value of water.

#### REDUCTION OF WASTE

34. However the figures are looked at and whatever the systems in use, the waste of prime water in the majority of countries is great. Taking the domestic consumption of water in the United Kingdom as an example, the breakdown is estimated to be:-

Water for WC flushing .....	35%
Personal washing and bathing .....	35%
Laundry .....	10%
Washing up .....	10%
Car washing and garden use .....	6%
Drinking, cooking and food preparation .....	4%
	100%

35. With only 4% of water potably used, the possibility of economies in other uses is substantial. Putting bricks into lavatory cisterns during last year's drought was a primitive way of saving water. Devices operating a two-tier system can be bought as cheaply as £3.50. More sophisticated is the push-button apparatus used in some cities in France, the user releasing only enough water to flush the lavatory. Taking Jersey's water consumption at 1,100 million gallons a year, allotting a third of it to lavatories, and reducing the capacity of each cistern by a third, the saving per year would be over 100 million gallons. We are aware that such devices cannot be used in overhead cisterns but the proportion of these is diminishing.

36. Showers use much less water than baths. Spray taps for hand washing, etc., can save up to 80% of the conventional tap consumption. Metering will persuade many householders and offices to install such devices. We recommend that it be made mandatory for schools, public buildings and other places under the States' control to install all possible water-saving devices in new buildings and that there be a changeover in such existing buildings within three years. Swimming pools should be filled before the end of April annually, when water is usually in abundance.

37. The Water Authority would also have an effective part to play in encouraging a steady adoption of water-saving devices. We have been surprised to find that the question of water going into new buildings has so far never been considered. It is no one's responsibility. The Water Authority should be able to engender co-operation between the relevant States' Committees.

38. Tourism has an important role to play. It is the influx of something approaching a million visitors each year, most of them in the summer, that gives Jersey a water problem at all. We do not for a moment undervalue the benefits of tourism to the island. It is a governing factor in Jersey's economy. It is a valuable offset to the picture

abroad of Jersey as an offshore financial island and tax haven. We were pleasurably impressed by the readiness of proprietors of hotels and guest houses generally to co-operate. In applications for hotel extensions, no regard has so far been paid to the amount of extra water they will demand. We do not propose regulation but we believe that watchful persuasion could have a useful effect. The conflict between hotels wishing to provide more bathrooms *en suite* and the island's need to conserve water, particularly in the summer, could be resolved by the provision of showers which could be alternatively used when water is scarce. Guest house proprietors told us that in many cases their clients would not stand higher costs caused by capital expenditure on extra bathrooms. The future of tourism is uncertain and will need to be regularly discussed between the Water Authority and the Tourism Committee.

39. Important as tourism is as a factor in Jersey's water adequacy, it does not lessen the responsibility of the island's other activities. Everyone must become water-conscious, even in years when there appears to be no likelihood of shortage. The non-wasting of water is in the last analysis dependent on public goodwill. Pricing policy will need to be reinforced by public opinion. Awareness of the value of water must be awakened. There will be need for the Water Authority to carry on a continuing publicity campaign. "Don't Waste Water" posters should be prominently displayed in hotels, guest houses, public buildings, large offices, and industrial plants. Until water saving becomes a natural habit, the campaign will have to be frequently refreshed to avoid back-sliding. There is need for constant vigilance over distribution losses. The whole island's regard for water must be changed permanently. The fact that there was no hardship during the 1976 drought was due to what the public regarded as emergency measures. Henceforth water saving must be a normal measure.

#### SUPPLEMENTARY SUPPLIES

40. Although Jersey's water supplies will always depend overwhelmingly on rainfall going into reservoirs, there are four supplementary sources to be considered.

##### *I - Desalination*

41. The Jersey New Waterworks Company's desalination plant at La Rosière was an outstanding pioneer effort. By distilling sea-water it can provide 1.5 million gallons a day for over 200 days in the year. The plant is now seven years old and is expected to have another thirteen years to run. It has proved an invaluable support during the summer months when demand is at its peak. The Company acted with courage and foresight in commissioning it eleven years ago.

42. The use of the plant is, however, a yearly gamble. Desalinated water costs much more than reservoir water. The Jersey New Waterworks Company's water rates cannot be immediately adjusted to take account of the plant's non-use in years of deluge and its use in years of drought. The Company, being a commercial concern, therefore seeks to use the plant as little as is reasonably safe. It waits until what it deems the last moment when desalinated water is going to be needed. About this there can, unfortunately, be no accurate judgment.

43. We recommend that this yearly gamble be replaced by a firm policy of replenishment. The desalination plant should be used to keep the reservoirs, as far as is within its capacity, topped up from the beginning of May to the end of September. There would be additional cost. It would be less than that arising from the building of a new reservoir to meet a situation which may never arise. If the measures we have so far recommended reduce demand to the point where in any year topping up to the end of September is not going to be necessary, then the practice that year could be adjusted with the Water Authority's consent.

44. A proposal frequently made to us was that a second desalination plant should be installed as an alternative to flooding Queen's Valley. It may be needed eventually but in our view the need is not urgent. Important researches into new and cheaper methods of desalination are at present in progress, notably in Japan and in the United States. Possibilities of a breakthrough are reported to be hopeful. Cheaper desalinated water could result. There is time to await developments. The Water Authority would need to keep in touch and, if it judged wise, participate in research that it thought could be fruitful for the island. A constant, undogmatic, uncommitted judgment is required.

45. The case for a second desalination plant has not gone unchallenged. Questions of cost, siting, fuelling and vulnerability have been raised. With regard to cost, we do not see any way in which Jersey's water can be kept from becoming dearer. A standby such as this would come into use in the summer. We have proposed measures for its increased cost to fall mainly upon those who benefit from it. As for siting, we have been told there is room for extension at La Rosière.

46. Objections that supplies of desalinated water are vulnerable to fuel stoppages, to industrial action and to plant breakdown could have more substance. So far as breakdowns are concerned, the present plant has a good record. There is no reason to expect a new one to be less reliable. Industrial action is now a hazard common to much of the world's productive activities. If such a threat were carried out, it need not be crippling. In an emergency Jersey can subsist on very little water. The percentages of water usages given earlier (*para 34*) show how many of them are not essential at their accustomed levels, and the steady replenishment role we have recommended for desalinated water would preclude any sudden emergency.

47. The energy problem is of a different order. If all were permanently to depend on oil, then difficulties could arise. It is worth bearing in mind, however, that when the Opec countries first held the world to ransom, the shock was soon absorbed and practical adjustments were quickly made. The resulting situation has not been pleasant but it has proved bearable.

48. There is moreover the possibility of a second desalination plant's using a source of energy other than oil. The Resources Recovery Board's new incinerator at Bellozanne will be capable of producing some 10 million units of electricity per annum, reaching its peak each year in August, when any demand for desalinated water would be at its highest and the demand for electricity at its lowest. We understand that this electricity is to be fed into the Jersey

Electricity Company's power-house in St. Helier. It would be for the States to decide whether it should be supplied from there to the desalination plant at an advantageous rate.

49. By the time a second plant was working, solar energy, now being rapidly developed, might be possible. We recommend that this and wave-power, be investigated by the Water Authority.

## II - RRB Effluent

50. We accept that the introduction into the reservoirs of water from treated effluent will not be practical in the near future. The work the Resources Recovery Board has done so far is noteworthy. Even so, percentages of purity are at present not high enough. Chloride and nitrate levels will have to be reduced further and there may be virus problems. Even if these are overcome Jersey will face special difficulties in using purified effluent. Its successful use - some cities claim that their water can be re-purified six or seven times - depends on the capability it has of being discharged lower down a river after each use. Jersey has no rivers. Discharged water goes straight into the sea. Only one use of purified effluent would be possible.

51. This difficulty may eventually be overcome. The reclamation of pure water from effluent by new methods is being actively researched in the United States, Holland and elsewhere. Developments are being made. The Water Authority should keep in touch with them and, if it would benefit Jersey's special requirements, should be ready to participate in such researches in co-operation with the Resources Recovery Board, commissioning an independent scientist.

52. We would add that we see no need for water samples to be sent to the United Kingdom for analysis. The work should be done by the States' Analyst in Jersey.

## III - House tanks

53. The ages-old system of collecting rainwater from the roofs of dwellings should be encouraged. Architects should be persuaded to design new houses with this in mind. We believe that the fear of contamination and epidemics is exaggerated. Generations of Jersey men and women had this as their sole source of water and came to no harm. If the Jersey New Waterworks Company's ban on mixing this water with their own is valid, then the rainwater could be drawn from outside taps for house-cleaning, garden-watering, car-washing, refreshing swimming pools and other purposes that need only second-class water.

## IV - Aquifers

54. This word, not yet to be found in all dictionaries, denotes areas where water is held underground naturally. These areas are not necessarily marshes or water-logged land. There is an important aquifer under St. Helier. Aquifers are dispersed about the island. The only one that has been brought seriously to our notice is that under the southern part of St. Ouen's Bay. Varying estimates have been given of the quantity of water that could be drawn from it. A reasonable range would be about 30-80 million gallons a year. We do not recommend St. Ouen's Bay aquifer as a main source of supply. We discuss later its possibilities for storage.

55. Although the controversy aroused by the Jersey New Waterworks Company's proposal to turn Queen's Valley into a reservoir was the starting point of the chain of events that culminated in the appointment of the present Water Inquiry Board, storage is the last question we deal with in this Report. The amount of stored water the island requires must be decided by a realistic judgment of future needs and of the effects of the policies we have recommended.

56. At this stage it will be useful to summarise the Jersey New Waterworks Company's present storage capacities and their comments on them.

### The Jersey New Waterworks Company Limited

#### INSTALLATIONS

(based on information furnished by the Engineer/Manager during site visits on 13th June 1977)

<i>Existing Water Storage:</i>	<i>Usable Storage Capacity:</i>
1. Val de la Mare reservoir	182 m.g.
2. Handois reservoir (incorporating old china quarries)	20 m.g.
3. Dannemarche reservoir	27 m.g.
4. Grands Vaux reservoir	31 m.g.
5. Millbrook reservoir	8 m.g.
	<u>268 m.g.</u>

*Val de la Mare reservoir* could be increased by 130 m.g. by increasing the height of the existing dam by 20 feet. Change of form of the dam would be necessary and this could only be done if the reservoir were empty and not in use. It is the view of the Engineer/Manager that it is not possible to build a new dam to the west of the existing one and the Jersey New Waterworks Company's consultant engineers expressed the same view.

*Handois reservoir* could be increased by 131 m.g. by creating a new dam, 25 feet higher, to the north of the existing one (i.e. inside the existing reservoir area). This could only be done if the reservoir were not in use and water from the La Hague and Les Mouriers stream abstraction points were diverted to other storage. Increased size of a dam would extend the area of the reservoir very considerably and would necessitate the purchase of valuable properties and the diversion of existing thoroughfares.



*Dannemarche reservoir* – the existing dam cannot be built on, for structural reasons. A new and larger dam, 30 feet higher, could be constructed immediately to the west of the existing dam which would have the effect of increasing storage capacity by 80 m.g. Major disruption of roads would result and the overall cost would not seem to justify the limited additional storage potential.

*Grands Vaux reservoir* – not capable of being enlarged because of (i) proximity of two residential areas; and (ii) nature of sides of the valley.

57. Faced in its view, which we do not accept, with an inevitable steadily rising demand, the Jersey New Waterworks Company's case for flooding Queen's Valley (*Appendix II*) is simple. A start can be made immediately. The Company believes that this is already overdue. Extensions of existing reservoirs are not possible, or will not be for several years. (We are not convinced that this is true of Val de la Mare. There should be further investigation). Queen's Valley, at an estimated cost of £4.4 millions, is the cheapest way of storing 225 million gallons of water. (Our opinion is that by the time the work was finished, the cost would be nearer £6 millions. The uncertain course of inflation makes all forward figures hypothetical). The Company adds that this scheme is the one that would most advantageously fit in with its present arrangements. The reservoir could be completed earlier than any comparable alternative.

58. In our opinion, unjustified stress is being put on this last point. If there is a need for additional storage, it is not so urgent as the Jersey New Waterworks Company makes out. There has been much talk about the "2% design year". This is the standard British expectation of the probability of drought. Domestic rationing was enforced in Jersey in 1949, 1959, and 1969. In 1976, the driest year of the century, none was needed. There was comparatively little inconvenience. Thanks to the seasonal nature of Jersey's economy, a water crisis in any year is bound to be brief. The Jersey New Waterworks Company's spectre of 1980 as a possible design year could just as well be any other year in the next half-century. There is, in our view, time enough for the Water Authority to put into effect the measures we recommend, to appraise the results and to plan and proceed methodically.

59. The Environmentalists' case against flooding Queen's Valley was eloquent. It was not decisive. If the need for a new reservoir was immediate and inescapable and if no alternative measures were possible, then we would agree with the Jersey New Waterworks Company's proposal. Neither of these is true. The flooding of Queen's Valley would offer no final solution. As we have noted earlier, the Company envisages further flooding eventually. The problem would be back with the States within the lifetime of some of its present Members. What the Jersey New Waterworks Company proposes is merely an expensive way of taking a breather.

60. We are convinced that there are better alternatives and that Queen's Valley should be flooded only as a last resort. We submit that instead of such an irrevocable and probably unnecessary step, amelioration of the present position should be gradual, planned and controlled. We are glad to know that the Jersey New Waterworks Company have a scheme for the setting up of a pumping station and trunk main system to carry the water to existing and possible future storage areas, if Queen's Valley is not flooded. Where water is concerned, as with other matters, the island must know when to start – and when to stop. The continuance of its present level of prosperity is not assured.

61. Of the various methods of storage put before us, we consider a storage aquifer in St. Ouen's Bay the most worth exploring. Dr. Frederick Sherrell, a consulting engineering geologist and chartered civil engineer of distinction, has proposed such a scheme. It was publicly explained and discussed at the Town Hall meetings on August 17th and 19th, 1977. The area used would be to the south of St. Ouen's Pond, (*Appendix III*) and a merit of the scheme is that it could be researched and tested within a relatively short time. If the tests are positive, the scheme could be put into operation by stages. It could be stopped after any one of them, without loss of whatever had been done up to that point. Its full capacity, if attainable, could be in the order of 400 million gallons.

62. A prominent feature of the scheme is the use of a double diaphragm wall, composed of bentonite slurry, cement and sand, which would be much cheaper than steel piling. If groundwater in the aquifer were drawn to below sea level, a constant head of fresh water maintained between the diaphragm walls would prevent sea-water entering the aquifer. (*Appendix IV*).

63. The arguments for and against the scheme are highly technical. There is a large discrepancy between Dr. Sherrell's estimated cost of the whole development (£2,890,500) and the Jersey New Waterworks Company's estimate (£5,695,750). We are not competent to make a firm recommendation in favour of a St. Ouen's Bay storage aquifer. We are satisfied that a strong *prima facie* case for exploratory tests of the scheme proposed by Dr. Sherrell has been made out. The Water Authority should initiate them immediately, by employing a firm that has wide experience and is not committed so far as the island is concerned.

64. Many other suggestions were received. An Albert Quay tank, underwater storage tanks, drainage systems, pipeline from France, nodding ducks, other forms of wave-power, anti-evaporation skins, the enclosure of St. Catherine's Bay and smaller bays as reservoirs – all were discussed. The turning of Hong Kong's Plover Bay into a reservoir was the most striking achievement brought to our notice. We do not think anything on so grandiose a scale is needed in Jersey. But the history of the alternating neglect and vigour of Hong Kong's water planning during the past hundred years, often depending on the personalities of succeeding Governors, is a striking example of what can be done when there is a will to do it. Some of the schemes presented to us seem fanciful now. There is no surety that not one of them will be practicable and desirable later. Evidence we have studied from many parts of the world shows that water management research is very active and on the edge of new developments. The case for Jersey to proceed deliberately is strong.

65. We thank the Jersey New Waterworks Company, the Environmentalists, various organisations, specialists and the many members of the public who helped us with verbal evidence and a documentation that ended by weighing over 22 lbs. We wish to stress particularly our appreciation of those States officials who came before us.



Their frankness, their readiness to discuss ideas with open minds, their knowledge and their judgment will remain a heartening memory. We thank also our secretary, Mrs. E. Phillips, whose complex task was admirably discharged. We would also wish to thank Barclaytrust International Limited for their kindness and courtesy in accommodating us on their premises.

#### CONCLUSION

66. Our last word must be to express the hope that if our recommendations are accepted, then what may be regarded as "the saving of Queen's Valley" will not end public interest in Jersey's water problem. At no stage was Queen's Valley an overriding consideration in our deliberations. It was only incidental to our main aim. That was, in accordance with our terms of reference, to evolve and recommend a proper system of control of the island's water cycle - supply, storage, conservation, use - and practical steps to ensure its efficiency.

67. The measures we have recommended are not revolutionary or new. They have already been adopted elsewhere. Peoples and Governments in other countries are being forced to manage their water in new ways. Jersey need not fear to do the same. Its size is an advantage, not a handicap. History shows that small communities are more capable of wisdom than great nations.

#### SIGNATURES

GILES GUTHRIE  
H.M. DE STE CROIX  
WILLIAM HALEY  
O. LE Q. MOURANT

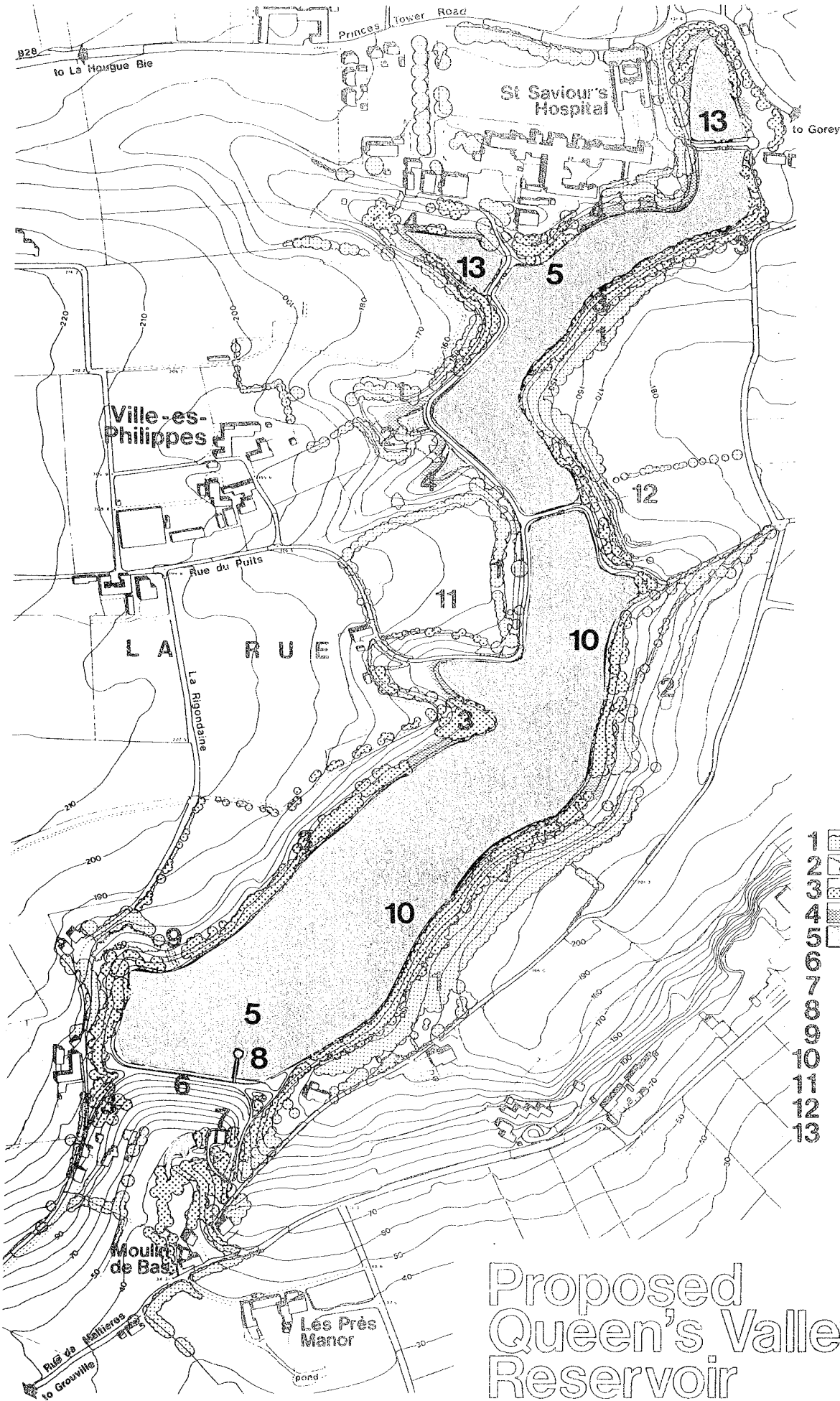
date 20th September, 1977.

## DETAILED LIST OF RECOMMENDATIONS

- (i) All Jersey's water above and below ground to be brought legally under one control. (*para 15*).
- (ii) The control to be vested in a Water Authority set up by the States. (*para 16*).
- (iii) A new Jersey Water Law to be passed. (*para 16*).
- (iv) The Water Authority to be separate from any existing States' Committees. (*para 17*).
- (v) The Water Authority to have final policy control over the Jersey New Waterworks Company. (*para 19*).
- (vi) The States to acquire a holding in the Jersey New Waterworks Company similar to that which it has in the Jersey Electricity Company. (*para 20*).
- (vii) The States to appoint the reorganised Company's chairman. (*para 20*).
- (viii) The Water Authority to promote water research and to participate in any that is relevant to the island's special needs. (*paras 22, 44, 51*).
- (ix) The Water Authority to educate the public in not wasting water. (*paras 22, 39*).
- (x) Metering of the whole island to be started immediately without any preliminary test period. (*para 25*).
- (xi) The States to pay for the costs of the meters and their installation, the costs to be written off as they occur. (*para 25*).
- (xii) Installing of meters to be done by an independent company. (*para 25*).
- (xiii) Water, gas and electricity meters to be read by the same inspector at the same time. (*para 25*).
- (xiv) Metering to be accompanied by a pricing policy; the scales to be approved by the Water Authority. (*para 26*).
- (xv) Hotels and other businesses benefiting from tourism to pay a higher rate during the summer months. (*para 27*).
- (xvi) Existing boreholes, wells and stream extraction points to be registered. (*para 29*).
- (xvii) No new boreholes should be sunk after the date of this Report until the States has legislated; the sinking of boreholes thereafter to need the permission of the Water Authority. (*para 29*).
- (xviii) Every borehole to be metered. (*para 29*).
- (xix) Consideration as to payments to the Water Authority by all commercial users of boreholes (according to meter readings) also that a higher rate could be charged during the holiday months to those firms who benefit from tourism. (*para 29*).
- (xx) Policy regarding domestic users, and farmers should be a matter for the Water Authority under the States. (*para 29*).
- (xxi) An examination of all wells, including those sealed up, to be made. (*para 31*).
- (xxii) Sealed wells not to be reopened without the Water Authority's permission. (*para 31*).
- (xxiii) Water-saving devices to be encouraged domestically and made mandatory in all new public buildings; existing public buildings to be changed over to them within three years. (*para 36*).
- (xxiv) Hotels planning new bathrooms *en suite* to be persuaded also to install showers that could be used alternatively. (*para 38*).
- (xxv) The desalination plant to be used to keep the reservoirs topped up from the beginning of May to the end of September. (*para 43*).
- (xxvi) If a second desalination plant is installed, the States to consider allocating to it electricity at an advantageous rate produced by the Resources Recovery Board's new incinerator at Bellozanne. (*para 48*).
- (xxvii) The Water Authority to investigate solar energy and wave-power. (*para 49*).
- (xxviii) The Water Authority and the Resources Recovery Board to co-operate where special island problems arise concerning the re-use of effluent. (*para 51*).
- (xxix) Water sampling to be transferred to the States Analyst. (*para 52*).
- (xxx) House collection of rainwater to be encouraged. (*para 53*).
- (xxxi) Exploratory tests of Dr. Sherrell's scheme for a St. Ouen's Bay storage aquifer to be made as soon as possible by a firm that has wide experience and is not committed so far as the island is concerned. (*para 63*).



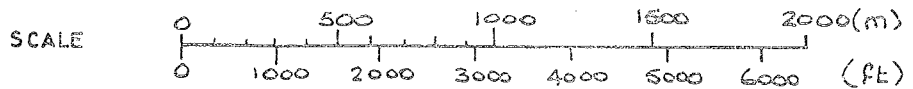
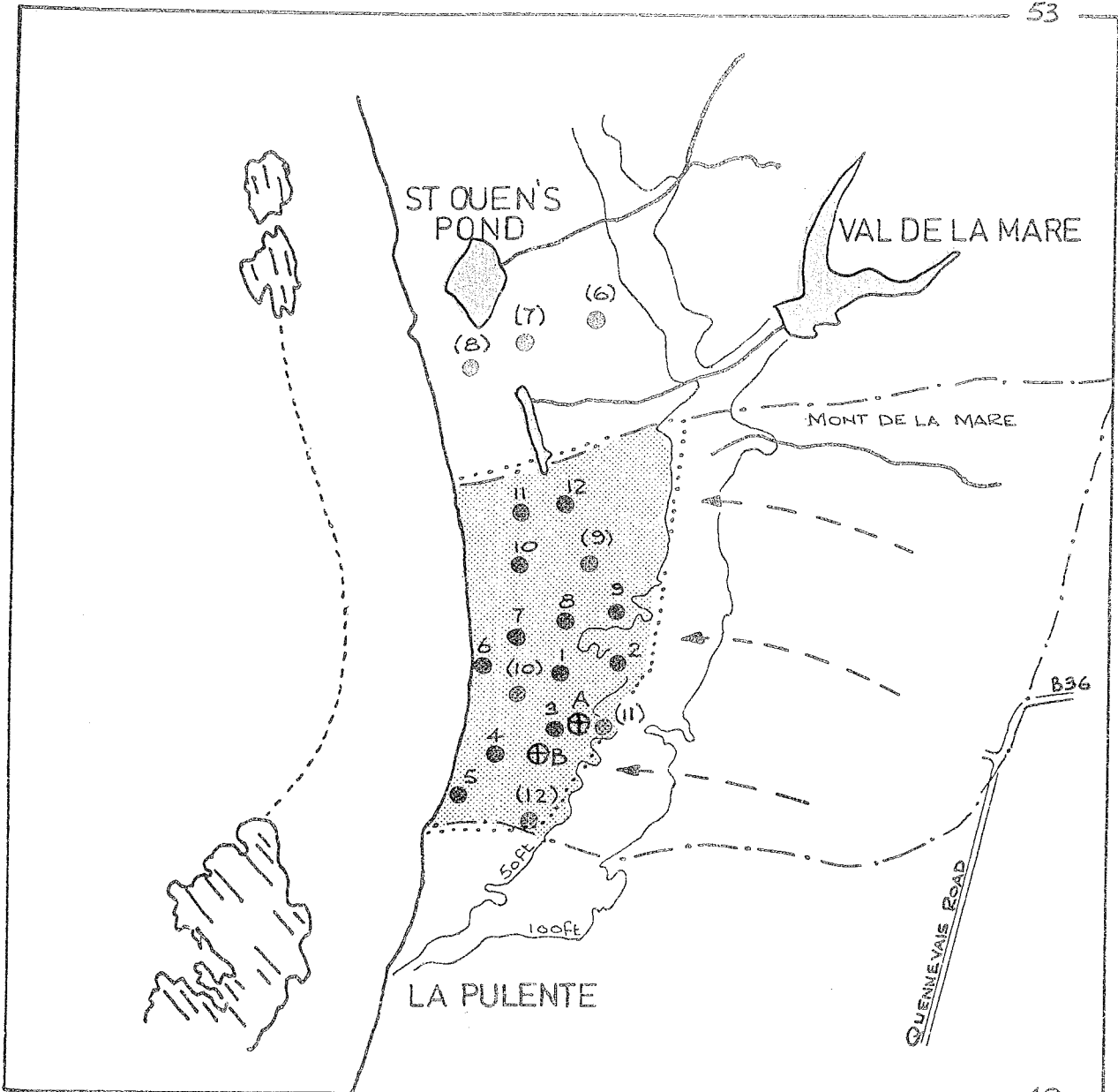
# APPENDIX II









- 1 EXISTING TREES
- 2 EXISTING SCRUB VEGETATION
- 3 NEW TREE AND SHRUB PLANTING
- 4 NEW WATERSIDE PLANTING
- 5 RESERVOIR AT TOP WATER LEVEL
- 6 DAM
- 7 PUMPING STATION
- 8 OUTLET SHAFT
- 9 INLET CASCADE
- 10 FOOTPATH/BRIDLEWAY
- 11 PROPOSED ROADS
- 12 BRIDGE/WEIR COMPLEX
- 13 SILT TRAP PONDS



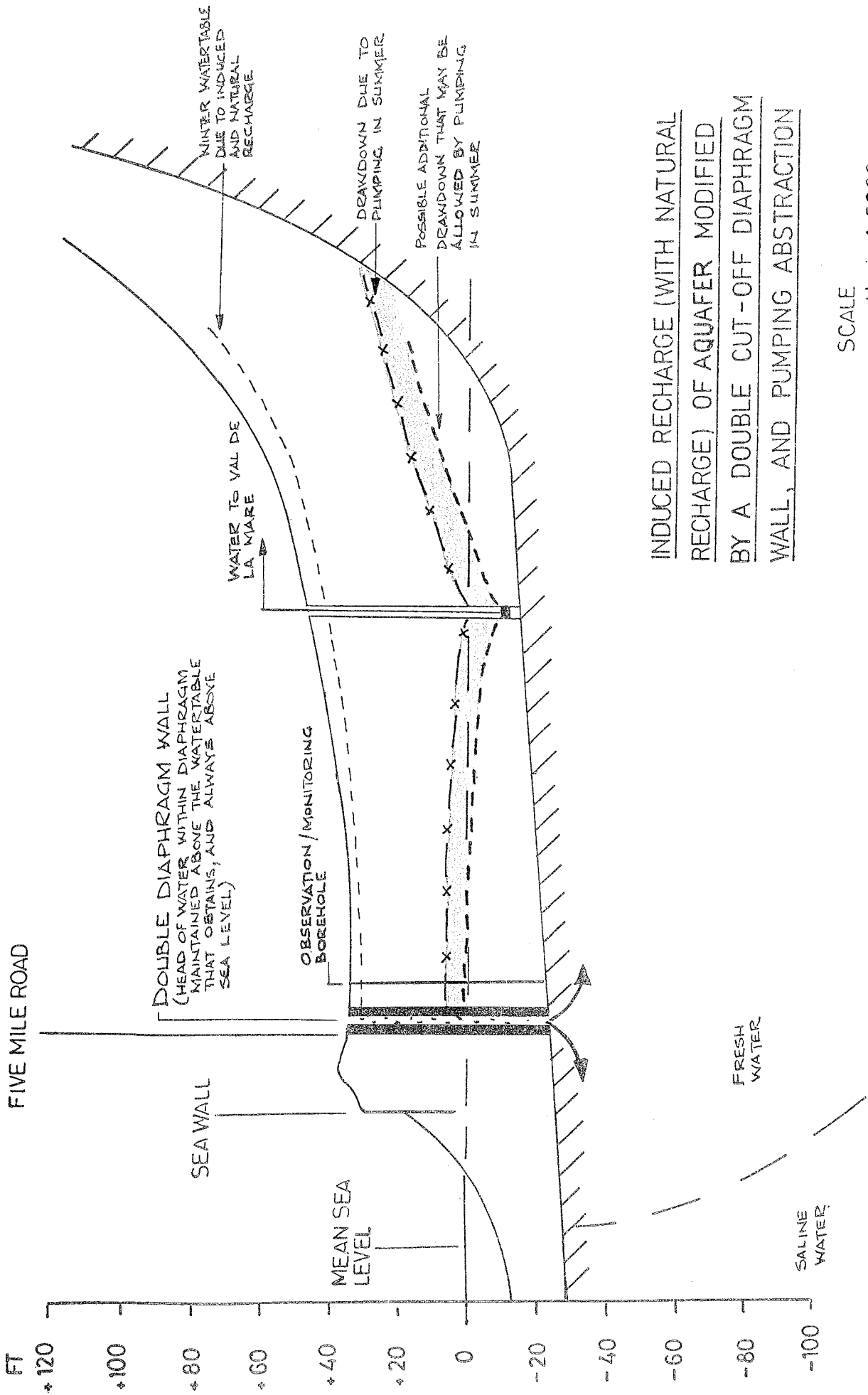
## Proposed Queen's Valley Reservoir



-  CATCHMENT BOUNDARY
-  GENERALISED DRAINAGE DIRECTION
-  STUDY AREA
-  SAND EXPLORATION BOREHOLE (1971)
-  " " " (1974)
-  WATERWORKS CO. BOREHOLES A+B

ST OUEN'S AQUIFER

APPENDIX IV



INDUCED RECHARGE (WITH NATURAL RECHARGE) OF AQAUFER MODIFIED BY A DOUBLE CUT-OFF DIAPHRAGM WALL, AND PUMPING ABSTRACTION

SCALE  
 Horiz. 1: 5000  
 Vert. 1: 500

DIAGRAMMATIC SECTION